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Biltmore Classic

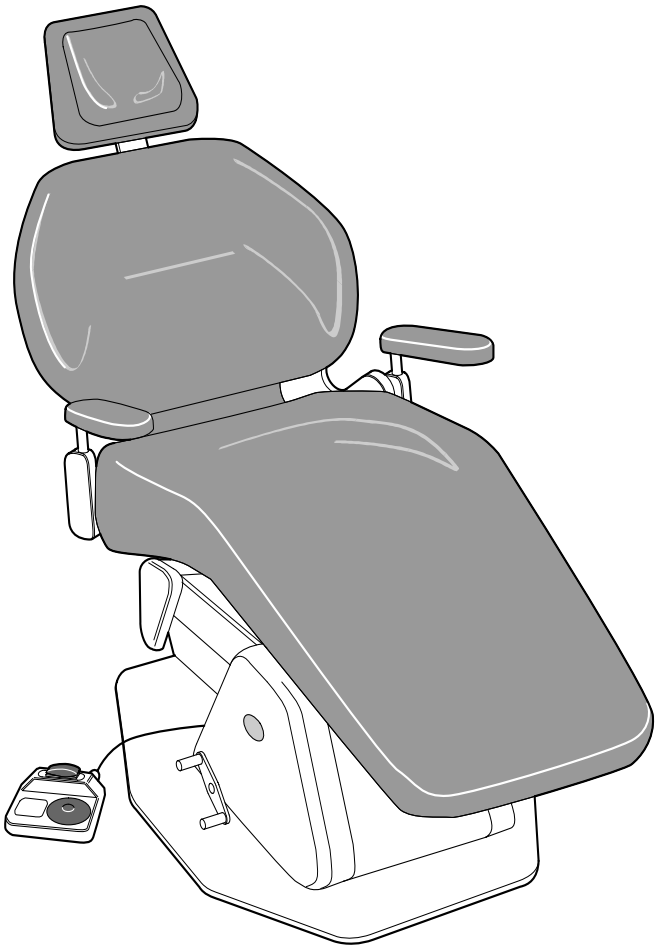
Concept L/R Classic

Knight® by MIDMARK

Dental Chair

Service and Parts Manual

Serial Number Prefixes:
CP & PB



Biltmore Clas.
Concept L/R
Classic

FOR USE BY MIDMARK
TRAINED TECHNICIANS ONLY

SF-1606

Part No. 004-0252-00 Rev. F (1/01/04)

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General Safety Instructions

Safety First: The primary concern of Midmark Corporation is that this chair is maintained with the safety of the patient and staff in mind. To assure that services and repairs are completed safely and correctly, proceed as follows:

(1) Read this entire manual before performing any services or repairs on this chair.

(2) Be sure you understand instructions contained in this manual before attempting to service or repair chair.

Safety Alert Symbols

Throughout this manual are safety alert symbols that call attention to particular procedures. These items are used as follows:

DANGER

A DANGER is used for an imminently hazardous operating procedure, practice, or condition which, if not correctly followed, will result in loss of life or serious personal injury.

WARNING

A WARNING is used for a potentially hazardous operating procedure, practice, or condition which, if not correctly followed, could result in loss of life or serious personal injury.

CAUTION

A CAUTION is used for a potentially hazardous operating procedure, practice, or condition which, if not correctly followed, could result in minor or moderate injury. It may also be used to alert against unsafe practices.

EQUIPMENT ALERT

An EQUIPMENT ALERT is used for an imminently or potentially hazardous operating procedure, practice, or condition which, if not correctly followed, will or could result in serious, moderate, or minor damage to unit.

NOTE

A NOTE is used to amplify an operating procedure, practice or condition.

Warranty Instructions

Refer to Midmark “Limited Warranty” printed in the Installation and Operation Manual for warranty information. Failure to follow guidelines listed below will void the warranty and/or render the Biltmore Classic or Concept L/R Dental Chair unsafe for operation.

- In event of a malfunction, do not attempt to use dental chair until necessary repairs have been made.
- Do not attempt to disassemble chair, replace malfunctioning or damaged components, or perform adjustments unless you are one of Midmark’s authorized service technicians.
- Do not substitute parts of another manufacturer when replacing inoperative or damaged components. Use only Midmark replacement parts.

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SECTION I
GENERAL INFORMATION

1.1 Scope of Manual

This manual contains detailed troubleshooting, scheduled maintenance, maintenance, and service instructions for the Biltmore Classic and the Concept L/R Dental Chair. This manual is intended to be used by Midmark's authorized service technicians.

1.2 How to Use Manual

A. Manual Use When Performing Scheduled Maintenance.

(1) Perform inspections and services listed in Scheduled Maintenance Chart (Refer to para 3.1).

(2) If a component is discovered to be faulty or out of adjustment, replace or adjust component in accordance with maintenance / service instructions (Refer to para 4.1).

B. Manual Use When Unit Is Malfunctioning And Cause Is Unknown.

(1) Perform an operational test on chair (Refer to para 2.1).

(2) Perform troubleshooting procedures listed in Troubleshooting Guide (Refer to para 2.2).

(3) If a component is discovered to be faulty or out of adjustment, replace or adjust component in accordance with maintenance / service instructions (Refer to para 4.1).

C. Manual Use When Damaged Component Is Known.

(1) Replace or adjust component in accordance with maintenance / service instructions (Refer to para 4.1).

1.3 Description Of Dental Chair

A. General Description (See Figure 1-1).

The Biltmore Classic and the Concept L/R Chair are dental operating chairs designed for the general dentistry market. Positions of Chair are adjustable thru use of electromechanical motors. The operator can initiate movement using one of two chair mounted membrane touch pads (Biltmore Classic only), the foot control or the optional hand control (Concept L/R only).

B. Major Serviceable Components (See Figure 1-1).

Membrane Touch Pads (Biltmore Classic only) (1, Figure 1-1)

A membrane touch pad assembly is located on both sides of the chairback to allow operation of chair from either side. The Automatic Operate / Exit switches (A) are predetermined program settings and actuated by depressing and releasing the appropriate switch. The functions can be stopped by momentarily depressing any switch on the touch pads or foot control.
Back Up, Back Down, Base Up, and Base Down switches (B) must be *depressed and held* until desired position is achieved.

Headrest Locking Assembly (2, Figure 1-1)

Headrest height can be changed by pulling out or pushing in on headrest. Tension of headrest locking assembly is pre-set at factory but can be adjusted if required (Refer to para 4.19).

Base Motor & Capacitor (3, Figure 1-1)

Base Motor controls the vertical movement of the chair by a cantilevered action up 13" (33 cm) while moving forward 4.5" (11.4 cm). Directional windings allow the motor to run forward or backward depending on which way power is applied to the windings. Base motor uses a run capacitor, located on the mounting plate next to the P.C. Board, to provide start and run power.
The motor is for *intermittent* operation. Continuous operation will cause motor to overheat, causing internal thermal overload to open, removing power from the motor. Normal cool off period for thermal overload to reset to closed position is 10 to 20 minutes.

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SECTION I
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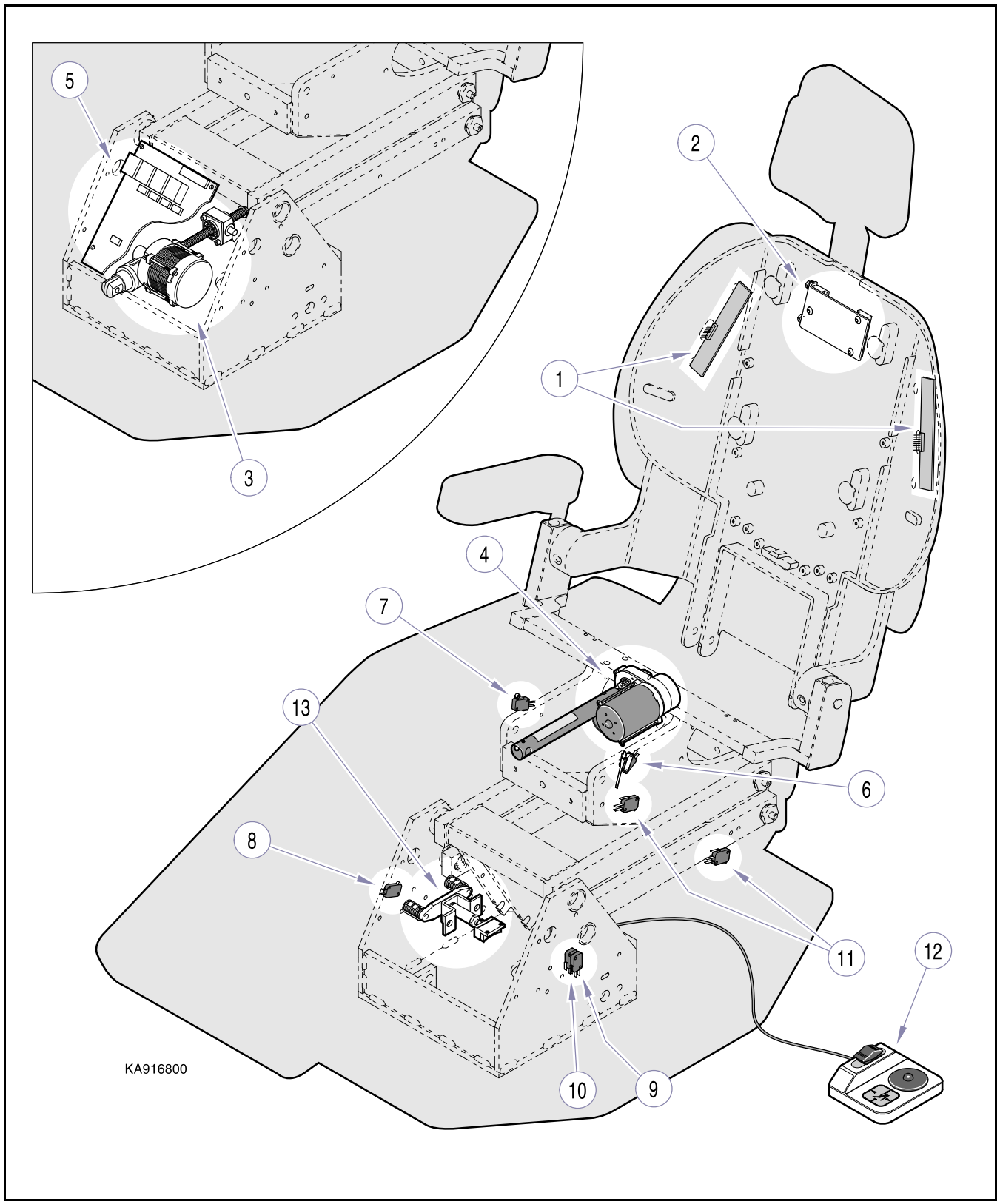

Figure 1-1. Component Location

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Back Motor & Capacitor (4, Figure 1-1)

Back Motor controls the movement of the chairback from a seated position (upright) to a reclined position (supine). The directional windings allow the motor to run forward or backward.
Back Motor uses a run capacitor, mounted on the motor, to provide start and run power.
Two Internal limit switches in motor prevent it from reaching its mechanical limits, damaging the motor. The normally closed (N.C.) limit switches are factory set and should not require any adjustments.
The motor is for *intermittent* operation. Continuous operation will cause the motor to overheat, activating the internal thermal overload, removing power from the motor. Normal cool off period for the thermal overload to reset is 10 to 20 minutes.

P.C. Board w/ Fuses (5, Figure 1-1)

The P.C. Board contains plug connectors, 12 VDC supply transformer for control circuitry, base and back motor control relays, 10 amp line (115 VAC) input motor fuse, 1/2 amp fuse for low voltage (12 VDC) circuitry. Spare fuses (C) are located to the left of each operational fuse.

Back Up Limit Switch (6, Figure 1-1)

Back Up Limit Switch is a normally closed (N.C.) switch, located on the seat frame of *patient's* left side. It controls the amount Back section moves upright, to a seated position, from reclined (supine) position. As Back section moves upright, seat section is also moving inward. When the spacer, located on *patient's* left side seat support, contacts the switch actuator on Back Up Limit Switch it causes N.C. contacts to open, removing power from Back Motor.

Back Down Program Limit Switch (7, Figure 1-1)

Back Down Program Limit Switch is a normally closed (N.C.) switch that *only* works in conjunction with the Auto Operate (Green) switch on Foot Control or on membrane switch. The limit switch is located on a bracket, on the *patient's* right side, attached to the platform weldment.
After Auto Operate (Green) switch is depressed the Back section begins to recline and seat section moves forward. When the programming plate, located on *patient's* right side seat support, contacts the switch actuator on Back Down Program Limit Switch it causes N.C. contacts to open, removing power to Back Motor. The programming plate is adjustable to increase or decrease amount of recline on Back section.

Base Up Program Limit Switch (8, Figure 1-1)

Base Up Program Limit Switch is a normally closed (N.C.) switch that *only* works in conjunction with the Auto Operate (Green) switch on Foot Control. The limit switch is located on a bracket, on *patient's* right side, attached to upright housing assembly. After Auto Operate (Green) switch is depressed Base section begins to move upward. During upward movement a program switch cam is slowly rotating clockwise. The cam has a high spot machined on it. When this high spot contacts switch actuator of limit switch N.C. contacts open, removing power from Base Motor, stopping upward motion.
The program switch cam is adjustable to increase or decrease height at which chair stops.

Base Down Limit Switch (9, Figure 1-1)

Base Down Limit Switch is a normally closed (N.C.) switch located on the electrical connection plate, on *patient's* left side, attached to upright housing assembly. It is located toward the outside, next to Base Up Limit Switch.
Base Down Limit Switch works in conjunction with Auto Exit (Yellow) foot or membrane switch and / or with Base Down membrane or foot switch. As chair descends, a cam, located on pivot pin in upright housing rotates. When the cam contacts switch actuator on limit switch, it opens normally closed (N.C.) contacts removing power from Base Motor stopping chair.

Base Up Limit Switch (10, Figure 1-1)

Base Up Limit Switch is a normally closed (N.C.) switch located on electrical connection plate, on *patient's* left side, attached to upright housing assembly. It is located toward the inside, next to Base Down Limit Switch.
Base Up Limit Switch works in conjunction with Auto Operate (Green) foot or membrane switch and / or with the Base Up membrane or foot switch. As chair elevates, a cam, located on pivot pin in upright housing rotates. When cam contacts switch actuator on limit switch, it opens normally closed contacts, removing power from Base Motor stopping chair.

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Safety Bail Limit Switches (11, Figure 1-1)

The two Safety Bail Limit Switches are normally closed (N.C.) switches located on the parallel arms, on *patient's* right and left side.
The Safety Bail Limit Switches work in conjunction with Auto Exit (Yellow) foot or membrane switch and / or with Base Down membrane or foot switch. They have no affect when running other functions.
During the chair's descent, if bottom lift arm cover contacts an obstruction, cover will depress the switch actuator(s) of the Safety Bail Limit Switch(es) opening the normally closed contacts, removing power from Base Motor, stopping the descent. The Back Motor will continue to operate.
If the obstruction is removed, returning the switch(es) to the N.C. position, the Base Motor will operate and the chair will continue its descent.

Foot Switch (12, Figure 1-1)

The Foot Switch contains four, normally open switches for operation of Back Up, Back Down, Base Up and Base Down. When foot switch control pad (D) is moved in direction of one or two of the switches the control pad actuator operates the switch(es) closing normally open contacts, providing power to either one or both motors depending on the function(s) chosen. The control pad must be held in the position to maintain operation.
A separate rocker switch, on the Foot Switch, with two normally open contacts operate the Auto Operate (Green) and Auto Exit (Yellow) functions. Pressing and releasing either of the switches will close the contacts on the switch and initiate the function. Pressing any function during Auto operation will terminate the Auto function.

Rotational Foot Lock (Biltmore Classic only) (13, Figure 1-1)

The chair will rotate at its base 45° each way from center-line. To release the rotational lock, depress the left side of the lever assembly and rotate the chair. When in position, depress right side of lever to lock in position.

C. Theory of Operation (120 or 230 VAC Units) (See Section V for wiring diagram, electrical schematics and pictorial layouts).

Electrical Power:
Line voltage is supplied to the chair's PC circuit board thru chair's power cord and a terminal board. There is a 1/2 amp line input fuse on the PC circuit board which protects the board's circuitry from power spikes or excessive current draw. A transformer on PC circuit board reduces line voltage to 12 VDC. The 12 VDC provides power to operate the circuitry on PC circuit board, limit switches, membrane switch panel, and foot control.

Operation of Membrane Switch Panel:
PC circuit board supplies 12 VDC to one side of each of the normally open (N.O.) switches in membrane switch panel. When the operator presses a membrane switch, N.O. contacts for that switch are closed, completing a circuit; this allows 12 VDC signal to return to PC circuit board, activating the function the operator selected.

Operation of Foot Control:
PC circuit board supplies 12 VDC to common terminals of four N.O. switches (BACK UP, BACK DOWN, BASE UP, BASE DOWN) and N.O. AUTO EXIT / AUTO OPERATE program switch. When the operator depresses one of the switches, N.O. contacts for that switch are closed, completing a circuit; this allows 12 VDC signal to return to circuit board, activating the function the operator selected.

Back Up Function Operation:
When operator depresses BACK UP switch on either membrane switch panel or foot control, the N.O. switch closes, allowing 12 VDC signal to return to PC circuit board, enabling the function. When Back Up function is enabled, PC circuit board energizes Back Up relay coil. Line voltage is continuously supplied to one of the output contacts of the Back Up relay. So, when the N.O. output contacts of the relay close, line voltage is applied across windings of back motor causing it to run.

PC circuit board also monitors Back Up limit switch. When not tripped, N.C. Back Up limit switch completes a closed circuit, allowing a 12 VDC signal (supplied by PC circuit board) to return to PC circuit board which allows Back Up function to continue to run. When the N.C. switch is tripped (indicating the back motor is at its "up" limit), limit switch circuit opens, stopping 12 VDC signal from returning to PC circuit board. PC board then de-energizes Back Up relay, causing back motor to stop.

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Back Down Function Operation:
When operator depresses BACK DOWN switch on either membrane switch panel or foot control, the N.O. switch closes, allowing 12 VDC signal to return to PC circuit board, enabling the function. When Back Down function is enabled, PC circuit board energizes Back Down relay coil. Line voltage is continuously supplied to one of the output contacts of the Back Down relay. When N.O. output contacts of relay close, line voltage is applied across windings of back motor causing it to run. When back motor reaches its “down” limit, a N.C. limit switch located internally within back motor opens, opening circuit and causing back motor to stop. When operator releases BACK DOWN switch, PC circuit board then deenergizes Back Down relay.

Base Up Function Operation:
When operator depresses BASE UP switch on either membrane switch panel or foot control, the N.O. switch closes, allowing 12 VDC signal to return to PC circuit board, enabling the function. When Base Up function is enabled, PC circuit board energizes Base Up relay coil. Line voltage is continuously supplied to one of the output contacts of Base Up relay. When N.O. output contacts of relay close, line voltage is applied to base motor causing it to run.

PC circuit board also monitors Base Up limit switch. When not tripped, N.C. Base Up limit switch completes a closed circuit, allowing a 12 VDC signal (supplied by PC board) to return to PC board which allows Base Up function to continue to run. When N.C. limit switch is tripped (indicating base motor is at its “up” limit), the switch circuit opens, stopping 12 VDC signal from returning to PC board. PC board then deenergizes Base Up relay, causing base motor to stop.

Base Down Function Operation:
When the operator depresses BASE DOWN switch on either membrane switch panel or foot control, N.O. switch closes, allowing 12 VDC signal to return to PC board, enabling the function. When Base Down function is enabled, PC circuit board energizes Base Down relay coil. Line voltage is continuously supplied to one side of output contacts of Base Down relay. When N.O. output contacts of relay close, line voltage is applied to base motor causing it to run.

PC board also monitors Base Down limit switch. When not tripped, N.C. Base Down Limit Switch completes a closed circuit, allowing a 12 VDC signal (supplied by PC board) to return to PC board which allows Base Down function to continue to run. When N.C. limit switch is tripped (indicating base motor is at its “down” limit), switch circuit opens, stopping 12 VDC signal from returning to PC board. PC board then deenergizes Base Down relay, causing base motor to stop.

Auto Exit Function Operation:
When the operator depresses AUTO EXIT switch on either membrane switch panel or foot control, N.O. switch closes, allowing 12 VDC signal to return to PC board, enabling the function. When Auto Exit function is enabled, PC board energizes Base Down and Back Up relay coils. Line voltage is continuously supplied to one side of output contacts of the two relays. When N.O. output contacts of the two relays close, line voltage is applied to base and back motors causing them to run.

PC board also monitors Base Down and Back Up limit switches. When not tripped, N.C. switches complete a closed circuit, allowing a 12 VDC signal (supplied by PC board) to return to PC board which allows Base Down and Back Up functions to continue to run. When N.C. switches are tripped (indicating motors are at “Exit” position), the switch circuits open, stopping 12 VDC signals from returning to the PC board. PC board then deenergizes Base Down and Back Up relays, causing motors to stop.

Auto Operate Function Operation:
When the operator depresses AUTO OPERATE switch on either membrane switch panel or foot control, N.O. switch closes, allowing 12 VDC signal to return to the PC board, enabling the function. When Auto Operate function is enabled, PC board energizes Base Up and Back Down relay coils. Line voltage is continuously supplied to one side of output contacts of the two relays. When N.O. output contacts of the two relays close, line voltage is applied to base and back motors causing them to run.

PC board also monitors Base Up Program limit switch and Back Down Program limit switch. When not tripped, N.C. switches complete a closed circuit, allowing a 12 VDC signal (supplied by the PC board) to return to PC board which allows Base Up and Back Down functions to continue to run. When N.C. limit switches are tripped (indicating motors have reached their *manually* programmed position - both of the limit switch stops can be manually adjusted by the operator to “program” a desired exam / procedure position), limit switch circuits are opened stopping 12 VDC signals from returning to PC board. The PC board then deenergizes Base Up and Back Down relays, causing motors to stop.

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Safety Bail Limit Switches

During Base Down or Auto Exit modes, as chair is descending, should bottom lift arm cover contact an obstruction one or both normally closed (N.C.) Safety Bail Limit Switches located beneath cover, will open removing power from Base Motor, stopping descent. When the obstacle is removed switch(es) will close, energizing Base Motor, and chair will continue to descend. The switches have no affect on rest of operations.

1.4 Standard Torque Specifications

The following standard torque specifications in Table 1-1 apply to the hardware used on the unit unless otherwise listed elsewhere in the service procedures or parts illustrations:

Table 1-1. Torque Specifications

Hardware Size	Torque Values
#6	11 to 21 inch-lbs. (1.2 to 2.3 N•M)
#8	20 to 30 inch-lbs. (2.2 to 3.3 N•M)
#10	32 to 42 inch-lbs. (3.6 to 4.8 N•M)
1/4 inch	75 to 85 inch-lbs. (8.5 to 9.6 N•M)
5/16 inch	18 to 22 ft.-lbs. (24.4 to 29.8 N•M)
3/8 inch	31 to 35 ft.-lbs. (42.0 to 47.5 N•M)
1/2 inch	50 to 60 ft.-lbs. (67.8 to 81.4 N•M)

1.5 Specifications

Factual data for the Biltmore Classic Dental Chair is provided in Table 1-2. Also, see Figure 1-2.

Table 1-2. Specifications

Description	Data
Weight of a Unit:	
Without Shipping Carton	355 lbs (161.0 kg)
With Shipping Carton	367 lbs (166.5 kg)
Shipping Carton:	42 in. "L" x 29 in. "W" x 35 in. "H" (106.7 cm x 73.7 cm x 88.9 cm)
Dimensions (See Figure 1-2):	
Chair Top Length	71.5 in. (181.6 cm)
Chair Top Length (headrest extended)	78.0 in. (198.1 cm)
Base	24 in. “W” x 34 in. “L” (61 cm x 86.4 cm)
Chair Top Width	25.5 in. (64.7 cm)
Overall Width	26.5 in. (67.3 cm)
Chair Adjustment:	
Base	90° rotation (45° each way from center-line) (max.)
Seat Height	20.5 to 34.5 in. (52.0 to 87.6 cm)
Headrest Height	59.5 to 68.5 in. (151.1 to 174 cm)
Weight Capacity (Maximum):	325 lbs. (147.4 kg
Electrical Requirements:	115 VAC Nominal 110-126 VAC, 50/60 HZ, 8.0 amp, single phase

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SECTION I
GENERAL INFORMATION

230 VAC Nominal
220-252 VAC 50/60 HZ,
4.0 amp, single phase

Power Consumption: .....115 VAC @ 8 amps = 920 Watts
230 VAC @ 4 amps = 920 Watts

Fuse Rating:

12 VDC Line Input Fuse ..... 0.5 amp, 250 VAC
5 x 20mm, Type Slo-Blo

115 VAC Motor Fuse..... 10.0 amp, 250 VAC
5 x 20mm, Type Fast- acting

230 VAC Motor Fuse..... 5.0 amp, 250 VAC
5 x 20mm, Type Fast-acting

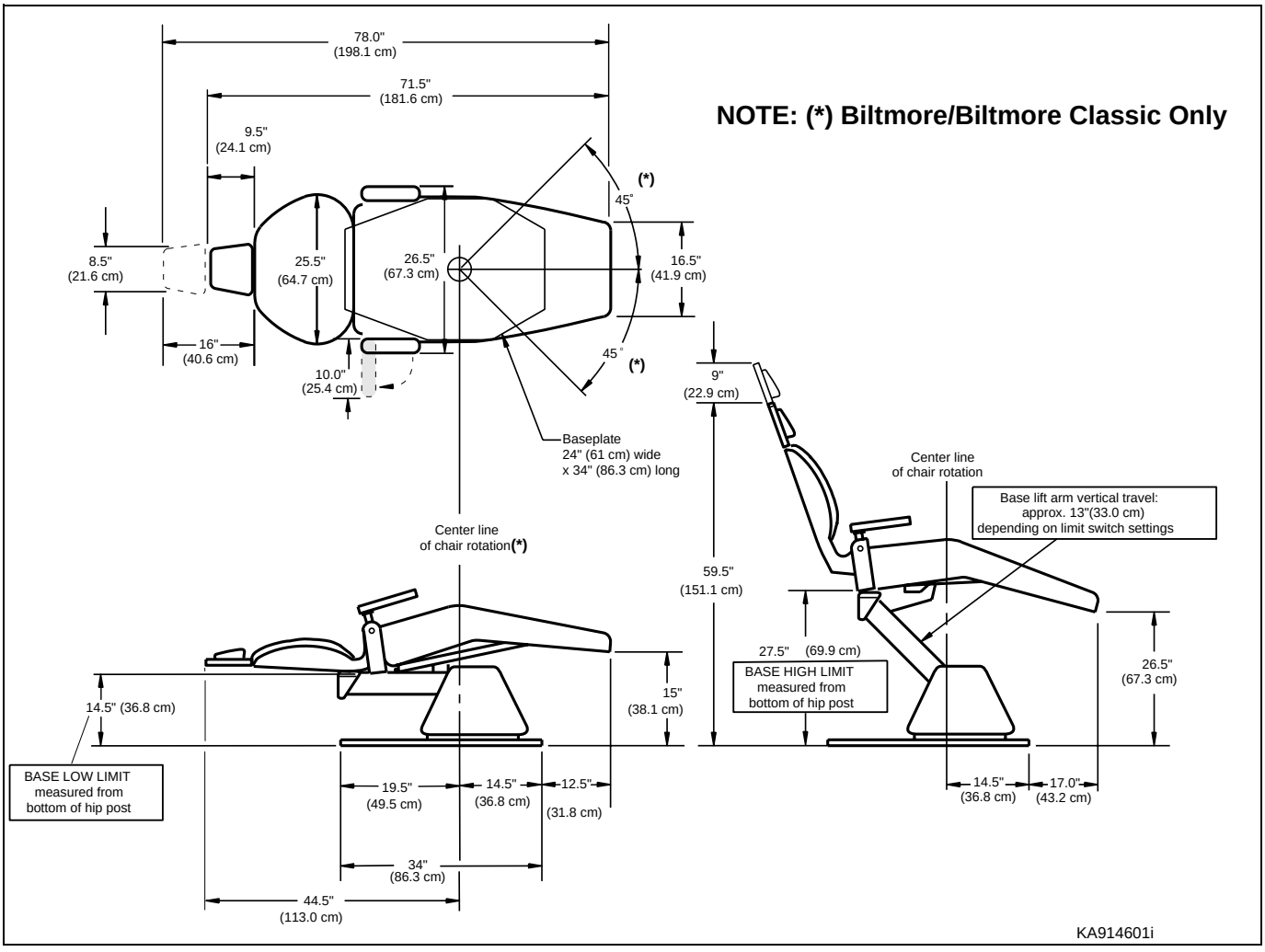

Figure 1-2. Dimensional Specifications

1.6 Parts Replacement Ordering

If a replacement part is required, order the part directly from the factory as follows:

(1) Refer to Figure 1-3 to determine the location of the model number and serial number of the chair and record this data. Refer to the Parts List to determine the item numbers of the parts, part numbers of the parts, descriptions of the parts, and quantities of parts needed and record this data (Refer to para 6.1).

NOTE
To assure expedient service and correct parts you must have the correct *Model and Serial Number* of the chair.

(2) Determine installation date of chair and record this data. Call Midmark (1-800 643-6275) and ask for Technical Service Department. Please have the ***Model and Serial Number*** of the chair.

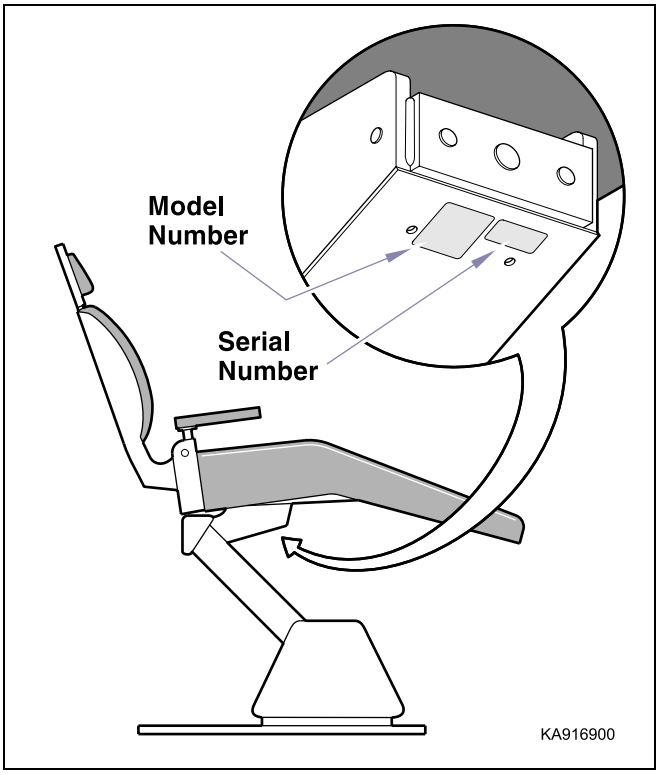

Figure 1-3. Model Number / Serial Number Location

Table 1-3. Special Tool List

Description of Special Tool	Manufacturer's Name / Address / Phone	Manufacturer's Part Number	Purpose of Special Tool
Multimeter *	Commercially Available	Any Type	Used to perform continuity and voltage checks.
Wood Support, 2" x 4" x 18" (5 cm x 10.1 cm x 45.7 cm) Qty. 2	Commercially Available	Any Type	Used to support chair top when base motor is being removed.
Jumper wire with insulated clips	Made up by technician	N/A	For jumpering various test points during trouble-shooting.
Torque Wrench *	Commercially Available	Any Type	Used to tighten nuts or screws to specified values.
* *Tool should be calibrated annually to ensure proper specifications are met.*			

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SECTION II
TESTING AND TROUBLESHOOTING

2.1 Operational Test (See Figure 2-1)

In order to effectively diagnose a malfunction of chair, it may be necessary to perform the following operational test:

WARNING
Refer to the Operator's Manual for complete instructions on operating the chair. Failure to do so could result in personal injury.

NOTE
The Operational Test, for the most part, only describes what ***should*** happen when chair is operated. If the chair does something other than described, a problem has been discovered. Refer to Troubleshooting Guide to determine cause of problem and its correction.

WARNING
When performing various checks with chair plug in and covers off use extreme care to prevent accidental electrical shock. Failure to comply could cause severe injury.

(1) Plug chair power cord into a grounded, non-isolated, correctly polarized outlet, that has proper voltage for chair.

(2) Depress Back Up, Back Down, Base Up, and Base Down buttons on membrane switch panel.

Observe. Chair should move in direction corresponding to button being depressed. No motor should make excessive squealing noises. Movement should be steady and should match speed and range of motions listed below:
Chair Speeds (±3 second):
Back Up to Back Down.....15 seconds
Back Down to Back Up.....15 seconds
Base Up to Base Down .....15 seconds
Base Down to Base Up .....15 seconds
Range of Motion (±2°):
Back Up ..... up to 82° (above horizontal)
Back Down.....down to 14° (above horizontal)
See Table 1-2 and Figure 1-3 for maximum and minimum heights.

(3) Place a 325 lb. (147.4 kg.) weight on center of seat section of chair.

Observe. Seat section should not drift downward under weight.

(4) Depress Base Up and Base Down buttons on membrane switch panel.

Observe. Base motor should not squeal or make excessive noise when lifting weight. Base motor should be able to lift weight. Movement should be steady.

(5) Remove weights from chair. Then, place a 100 lb. (45.4 kg.) weight on center of back section of chair (with back section at approximately 45º above horizontal).

(6) Depress Back Up and Back Down buttons on membrane switch panel.

Observe. Back motor should not squeal or make excessive noise when lifting weight. Back motor should be able to lift weight. Movement should be steady.

(7) Remove weights from chair.

(8) Run Back Up function all the way up and Base Down function all the way down.

NOTE
Both Back Down Program and Base Up Program limit switches are manually adjustable limit switches which allow an operator to "manually program" where chair will stop when using Auto Operate function.

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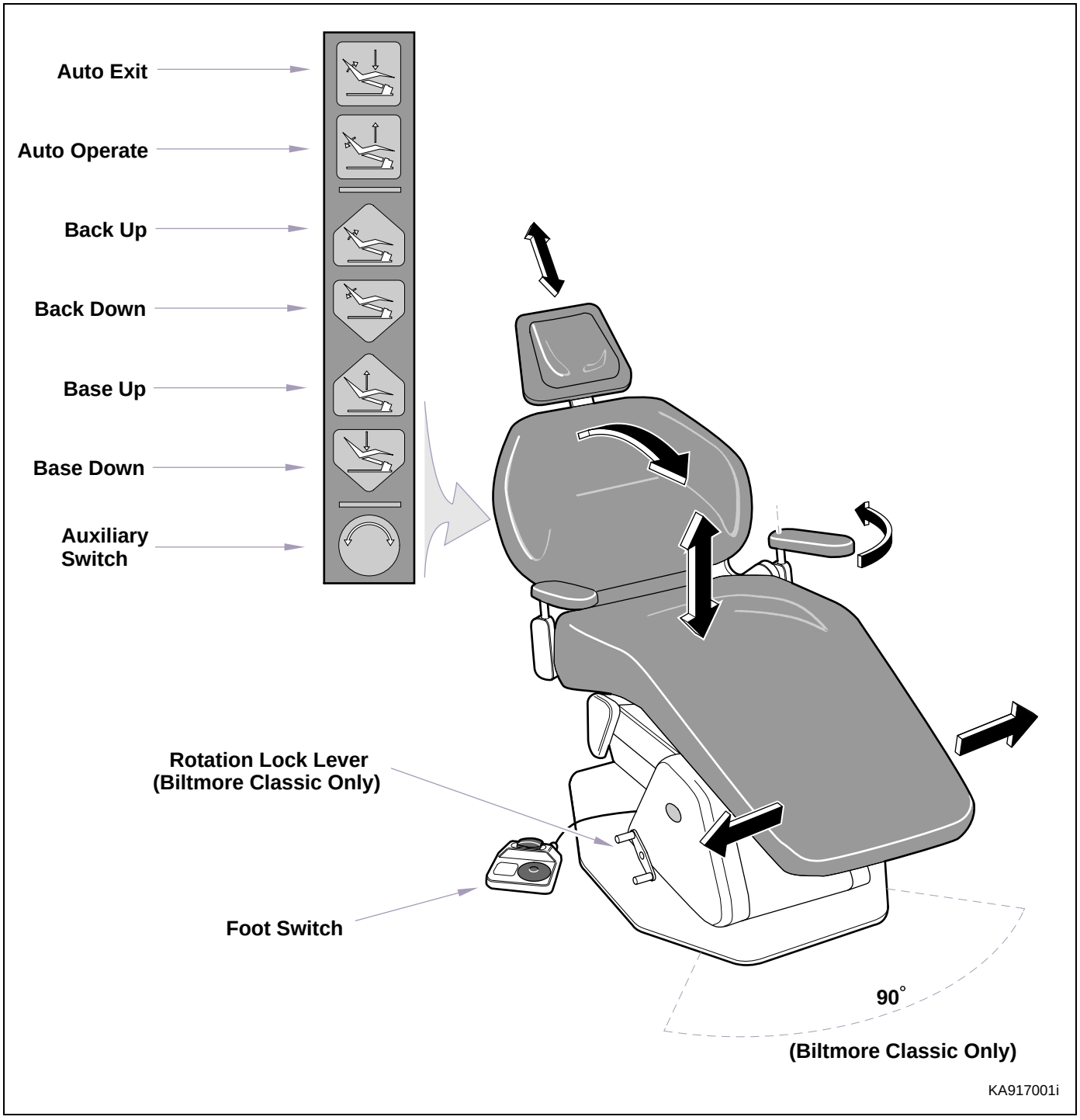

Figure 2-1. Operational Test

(9) Depress Auto Operate button on membrane switch panel.

Observe. Back Down function should run until its limit switch is tripped (Back Down Program limit switch), stopping it.
Base Up function should run until its limit switch is tripped (Base Up Program limit switch), stopping it.
Check both limit switches to verify that they were tripped.

(10) Depress Auto Exit button on membrane switch panel.

Observe. Back Up function should run until its limit switch trips (Back Up limit switch), stopping it.
Base Down function should run until its limit switch trips (Base Down limit switch), stopping it.
Check both limit switches to verify that they were tripped.

(11) Slide headrest in and out stopping at different positions. Push gently against headrest at each position.

Observe. Headrest should not require excessive force to position. When in a position, headrest should not move when a slight pressure is applied.

(12) Rotate chair top until it hits a stop. Then rotate chair top in opposite direction until it hits a stop.

Observe. Chair top should rotate smoothly and easily; not requiring excessive force. The chair top should be able to be rotated from stop to stop which is 90° or 45° in each direction from centerline of chair.

(13) Depress Rotation Lock lever to locked position. Attempt to rotate chair top.

Observe. Chair top should not be able to be rotated when Rotation Lock lever is engaged.

(14) Rotate armrests out of way to side. Return each armrest back to normal position.

Observe. Armrests should be able to be rotated out of way easily and should not require excessive force. When armrests are returned they should detente into their normal position without excessive side-to-side play.

(15) Depress Back Up, Back Down, Base Up, Base Down, Auto Exit, and Auto Operate buttons on foot control.

Observe. When each of the buttons on foot control are depressed, appropriate function should activate.

(16) Depress Auto Exit (Yellow) and /or Base Down membrane or foot switch. As chair descends, push upward on bottom lift arm cover until one or both of the Safety Bail Limit switches operate.

Observe. When bottom lift arm cover contacts and operates Safety Bail Limit switch(es) chair should immediately stop its descent. Releasing bottom lift arm cover, returning Safety Bail Limit switch(es) to normally closed position, chair should continue to descend.
When in Auto Exit, after Back Section reaches its upward program position, returning Safety Bail switch(es) to the normally closed (NC) position will not cause Base to descend. Operating Base Down membrane or foot switch will cause chair to descend.

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2.2 Troubleshooting Procedures

Table 2-1 is a Troubleshooting Guide which is used to determine causes of malfunctions. Figure 2-2, is a pictorial diagrams that will assist in the troubleshooting procedures. Also refer to diagrams in Section V.

WARNING
Use extreme caution when testing components with chair plug into outlet. Line voltage (115 or 230 VAC) is present. Failure to comply could result in personal injury.

Problem	Symptom	Probable Cause	Check	Correction
Chair will not operate when ***any*** function is selected (from any of the membrane switch panels or foot control switches).	When a membrane switch panel or foot control switch is pressed, nothing happens and relays cannot be heard energizing).	Power cord is not plugged into facility wall outlet.	Check to see if power cord is plugged in.	Plug power cord into facility wall outlet.
		Facility circuit breaker providing power to chair is tripped.	Check to see if facility circuit breaker is tripped. One way of checking this is to plug a lamp into wall outlet that chair was plugged into.	If facility circuit breaker is tripped, determine what caused circuit breaker to trip, correct problem, and then reset / replace circuit breaker.
		Wire connections are loose.	Check all wiring connections from power cord to terminal board to PC circuit board. Use a multimeter to perform a continuity check on wires. Check for line voltage at plug J1 (line power input) on pins 1 (wht. or brn.) & 4 (blk or blue).	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections. Refer to Figures 2-2 thru 2-4.
		1/2 amp, 12 VDC, line input fuse is blown.	See Figure 2-2 for location of 12 VDC line input fuse. Perform continuity check on fuse.	Replace blown line input fuse. ***NOTE:*** There is a spare fuse located directly to the left of the fuse.
		PC circuit board is malfunctioning.	Check for line voltage by placing one meter probe on TB1, terminal 2 and the other on J5 (Power Output to Motors), pin 2 (white) and then on pin 5 (blue).	If no voltage replace PC circuit board. Refer to para 4.9.
No actions can be initiated from membrane switch panel and foot control.	Chair has power, but no functions can be initiated from membrane switch panel and foot control.	Line Motor circuit fuse is blown. 115 VAC fuse, 10 Amp 230 VAC fuse, 5 Amp	See Figure 2-2 for location of motor circuit fuse. Perform continuity check on fuse.	Replace blown motor circuit fuse. ***NOTE:*** There is a spare fuse located directly to the left of the line input fuse which may be used.
		PC circuit board is malfunctioning.	Check all wiring connections from power cord to terminal board to PC circuit board. Use a multimeter to perform a continuity check on wires. Check for line voltage at plug J1 (line power input) on pins 1 (wht. or brn.) & 4 (blk or blue). See Figures 2-2.	Replace wire harness or PC circuit board, whichever is defective. Refer to para 4.9.

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Problem	Symptom	Probable Cause	Check	Correction
One or more functions cannot be initiated from membrane switch panels.	Some functions can be initiated with hand control, but at least one cannot.	Membrane switch panel is malfunctioning (a switch membrane is malfunctioning).	Refer to Figure 2-2. Use a jumper wire to jump the 12 VDC pins of connector J2: B1 & B2 (Auto Exit), B1 & B3 (Auto Operate), B1 & B4 (Back Up), B1 & B5 (Back Down), B1 & B6 (Base Up), B1 & B7 (Base Down), B1 & B8 (Auxiliary), Each function should operate when jumped.	If all functions operate correctly when jumped, then fault is in the membrane switch panel. If so, replace membrane switch panel. Refer to para 4.15. If a function still does not work even when jumpered, fault is in motor circuit or PC circuit board. Continue troubleshooting using this guide.
		Wire connections loose.	Check all wiring connections between membrane switch panel and PC circuit board.	Clean any dirty connections. Tighten or repair any loose or damaged connections.
		PC circuit board is malfunctioning.	Replace suspect PC circuit board with known working PC circuit board.	Replace PC circuit board. Refer to para 4.9.
One or more functions cannot be initiated from foot control.	Some functions can be initiated with foot control, but at least one cannot.	Foot control is malfunctioning (a foot control switch is malfunctioning).	Perform a continuity check on each N.O. foot control switch in foot control (when switch is pressed, switch circuit should be closed) See Figure 5-2 or 5-8.	If foot control switch does not pass continuity check, replace switch. Refer to para 4.16.
			Refer to Figure 2-2. Use a jumper wire to jump the 12 VDC pins of connector J3: A1 & A2 (Auto Exit), A1 & A3 (Auto Operate), A1 & A4 (Back Up), A1 & A5 (Back Down), A1 & A6 (Base Up), A1 & A7 (Base Down), Each function should operate when jumped.	If all functions operate correctly when jumped, then fault is in foot control switch of non-operating function. If so, replace the malfunctioning switch of the foot control. Refer to para 4.16 & 4.17. If a function still does not work even when jumpered, fault is in motor circuit or PC circuit board. Continue troubleshooting using this guide.
		Wire connections loose.	Check all wiring connections between foot control switches and PC circuit board.	Clean any dirty connections. Tighten or repair any loose or damaged connections.
		PC circuit board is malfunctioning.	Replace suspect PC circuit board with known working PC circuit board.	Replace PC circuit board. Refer to para 4.9.
BACK UP ***and*** BACK DOWN functions do not work. All other functions work.	When BACK UP and BACK DOWN buttons are pressed, chair will not move (all other functions work).	Thermal overload switch in back motor is activated to the open position.	Check for continuity between White and Red, and White and Blk Motor leads. Internal limit switches must be closed. Refer to Figures 5-3 or 5-9.	Wait 10 to 20 minutes to allow back motor to cool and bi-metal thermal protector to reset. (Motor is for intermittent use and should not be run constantly).
		Back capacitor is weak or blown.	Replace suspect back capacitor with known working back capacitor.	Replace back capacitor. Refer to 4.8.
		Wiring connections loose.	Check all wiring connections to back motor.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.

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Problem	Symptom	Probable Cause	Check	Correction
BACK UP ***and*** BACK DOWN functions do not work. All other functions work (continued)	When BACK UP and BACK DOWN buttons are pressed, chair will not move (all other functions work) (continued)	Back motor is malfunctioning.	Replace suspect back motor with known working back motor assembly.	Replace back motor. Refer to para 4.7.
BACK UP function works, but BACK DOWN function does not or BACK DOWN function works, but BACK UP function does not. All other functions work.	Back motor runs in one direction, but not the other.	Wiring connections loose.	Check all wiring connections from PC circuit board to back motor assembly.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Membrane switch panel is malfunctioning (BACK UP or BACK DOWN switch membrane is malfunctioning).	Refer to Figures 2-2, 5-2 and 5-8. Use a jumper wire to jump 12 VDC pins of connector J2: B1 & B4 (Back Up), B1 & B5 (Back Down), Each function should operate when jumped.	If both functions operate correctly when jumped, then fault is in the membrane switch panel. If so, replace membrane switch panel. Refer to para 4.15. If a function still does not work even when jumpered, fault is in motor circuit or PC circuit board.
		Back Up Limit Switch is malfunctioning or is out of adjustment.	Perform continuity check on N.C. Back Up Limit Switch and check limit switch adjustment.	Replace Normally Closed, Back Up Limit Switch. Refer to para 4.12.
		Back motor is malfunctioning.	Replace suspect back motor with known working back motor.	Replace back motor. Refer to para 4.7.
		Back Down or Back Up motor internal limit switch is malfunctioning or out of adjustment.	Perform continuity check on motor internal limit switches.	Replace back motor. Refer to para 4.7.
		Relay (K1 or K2) for Up or Down function on PC circuit board is malfunctioning).	Refer to Figure 2-2 for this check. Use a jumper wire to jump line voltage Test Points C2 and G; Back Up function should run. Use a jumper wire to jump line voltage Test Points C1 and G; Back Down function should run. If motor runs when a relay is jumped, fault is in membrane switch panel, wiring, or PC circuit board. If motor does not run when a relay is jumped, fault is in wiring or back motor.	Replace PC circuit board. Refer to para 4.9.
BASE UP ***and*** BASE DOWN functions do not work. All other functions work.	When BASE UP and BASE DOWN buttons are pressed, chair will not move (all other functions work).	Thermal overload switch in base motor is activated to the open position.	Check for continuity between Blue (common) and White (115 VAC) or Brown (230 VAC), and Blue (common) and Blk Motor leads.	Wait 10 to 20 minutes to allow back motor to cool and bi-metal thermal protector to reset. (Motor is for intermittent use and should not be run constantly).
		Base capacitor is weak or blown.	Replace suspect base capacitor with known working capacitor.	Replace base capacitor. Refer to 4.3.

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Problem	Symptom	Probable Cause	Check	Correction
BASE UP ***and*** BASE DOWN functions do not work. All other functions work (continued).	When BASE UP and BASE DOWN buttons are pressed, chair will not move (all other functions work) (continued).	Wiring connections loose.	Check all wiring connections to base motor assembly.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Base motor assembly is malfunctioning.	Replace suspect base motor assembly with known working base motor assembly.	Replace base motor. Refer to para 4.4.
	Base motor runs, but its shaft does not turn.	Base motor worm wheel is broken.	Check worm wheel in base motor.	Replace base motor worm wheel. Refer to para 4.5.
BASE UP function works, but BASE DOWN function does not or BASE DOWN function works, but BASE UP function does not. All other functions work.	Base motor runs in one direction, but not the other.	Wiring connections loose.	Check all wiring connections from PC circuit board back motor assembly.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Membrane switch panel is malfunctioning (BASE UP or BASE DOWN switch membrane is malfunctioning).	Refer to Figures 2-2, 5-2 or 5-8. Use a jumper wire to jump the 12 VDC pins of connector J2: B1 & B6 (Base Up), B1 & B7 (Base Down), Each function should operate when jumped.	If both functions operate correctly when jumped, then fault is in the membrane switch panel. If so, replace membrane switch panel. Refer to para 4.15. If a function still does not work even when jumpered, fault is in motor circuit or PC circuit board.
		Base Up Limit Switch is malfunctioning or is out of adjustment.	Perform continuity check on N.C. Base Up Limit Switch and check limit switch adjustment (should be a closed circuit when limit switch is *not* tripped).	Adjust or replace Normally Closed Base Up Limit Switch. Refer to para 4.10.
		Base Down Limit Switch is malfunctioning or is out of adjustment (causing an open circuit).	Perform continuity check on N.C. Base Down Limit Switch and check limit switch adjustment (should be a closed circuit when limit switch is *not* tripped).	Adjust or replace Normally Closed Base Down Limit Switch. Refer to para 4.10.
		One or both of the Safety Bail N/C Limit switches are open.	Perform continuity check on N.C. Safety Bail Limit Switches and check limit switch adjustments (should be a closed circuit when limit switch is *not* tripped).	Adjust or replace Normally Closed Safety Bail Limit Switch(es). Refer to para 4.14.
		Base motor is malfunctioning.	Replace suspect base motor with known working base motor.	Replace base motor. Refer to para 4.4.

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Problem	Symptom	Probable Cause	Check	Correction
BASE UP function works, but BASE DOWN function does not or BASE DOWN function works, but BASE UP function does not. All other functions work (continued).	Base motor runs in one direction, but not the other (continued).	Relay (K4 or K3) for Up or Down function on PC circuit board is malfunctioning.	Refer to Figure 2-2. Use a jumper wire to jump Line Voltage Test Points C4 and G; Base Up function should run. Use a jumper wire to jump Line Voltage Test Points C3 and G; the Base Down function should run. If the motor runs when a relay is jumped, the fault is in the membrane switch panel, wiring, or PC circuit board. If the motor does not run when a relay is jumped, the fault is in the wiring or base motor.	After checking the wiring, membrane switch assemblies and base motor replace PC circuit board. Refer to para 4.9.
Auto Operate function does not work properly.	Nothing happens when Auto Operate button is pressed (all other functions work).	Membrane switch panel is malfunctioning (Auto Operate switch membrane is malfunctioning).	Refer to Figures 2-2, 5-2, and 5-8. Use a jumper wire to jump 12 VDC pins of connector J2: B1 & B3 (Auto Operate), The Auto Operate function should operate when jumped.	If Auto Operate function operates correctly when jumped, then fault is in the membrane switch panel. If so, replace membrane switch panel. Refer to para 4.15. If a function still does not work even when jumpered, fault is in motor circuit or PC circuit board.
		Wiring connections loose.	Check all wiring connections to membrane switch panels, Back Down Program limit switch, and Base Up Program limit switch.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		Back Down Program limit switch is malfunctioning (causing open circuit).	Perform continuity check on N.C. Back Down Program limit switch (should be a closed circuit when limit switch is *not* tripped).	Replace Back Down Program limit switch. Refer to para 4.13.
		Back Down Program limit switch is normally tripped (limit switch is not adjusted to stop back section at operator's desired position).	Check with operator to see if operator is aware that the back section can be manually adjusted to be stopped where desired in the Auto Operate function.	Show the operator how to manually adjust the Back Down Program limit switch (Refer to Back Programming Procedure in the Installation Manual).
		Back Down Program limit switch trip arm is not contacting back programming plate.	Check to see if Back Down Program limit switch trips when it contacts the back programming plate.	Adjust the Back Down Program limit switch so it trips properly when it contact the back programming plate. Refer to para 4.13.
		Base Up Program limit switch is malfunctioning (causing open circuit).	Perform continuity check on N.C Base Up Program limit switch (should be a closed circuit when limit switch is *not* tripped).	Replace Base Up Program limit switch. Refer to para 4.11.

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Problem	Symptom	Probable Cause	Check	Correction
Auto Operate function does not work properly (continued).	Nothing happens when Auto Operate button is pressed (all other functions work) (continued).	Base Up Program limit switch is normally tripped (limit switch is not adjusted to stop base function at operator's desired position).	Check with operator to see if operator is aware that the base section can be manually adjusted to stop where desired in the Auto Operate function.	Show the operator how to manually adjust the Base Up limit switch (Refer to Base Programming Procedure in the Installation Manual).
		PC circuit board is malfunctioning.	Replace suspect PC circuit board with known working PC circuit board.	Replace PC circuit board. Refer to para 4.9.
Auto Exit function does not work properly.	Nothing happens when Auto Exit button is pressed (all other functions work).	Membrane switch panel is malfunctioning (Auto Exit switch membrane is malfunctioning).	Refer to Figures 2-2, 5-2, and 5-8. Use a jumper wire to jump 12 VDC pins of connector J2: B1 & B2 (Auto Exit), The Auto Exit function should operate when jumped.	If Auto Exit function operates correctly when jumped, then fault is in the membrane switch panel. If so, replace membrane switch panel. Refer to para 4.15. If a function still does not work even when jumpered, fault is in motor circuit or PC circuit board.
		Wiring connections loose.	Check all wiring connections to membrane switch panels.	Clean any dirty connections. Tighten any loose connections. Replace any damaged connections.
		PC circuit board is malfunctioning.	Replace suspect PC circuit board with known working PC circuit board.	Replace PC circuit board. Refer to para 4.9.
Back or base function drifts by itself.	Motor operates properly otherwise.	Motor brake is malfunctioning.	Replace suspect motor with known working motor.	Replace base motor (Refer to para 4.4) or back motor (Refer to para 4.7).
A function's button has to be pressed twice to get the function to move.	After a function's button is depressed, a click is heard (relay being deenergized) but the function does not activate. Depressing the button the second time causes the function to activate. **Note:** This will happen only if previous selected function was Auto Exit or Auto Operate function).	One of motor's "backup" limit switches is tripping before its "primary" limit switch, causing the motor to stop running, but since "primary" limit switch does not trip, PC circuit board does not receive signal to stop function by deenergizing its relay; so the function's relay remains energized. **Note:** This will happen only if previous selected function was Auto Exit or Auto Operate function).	Check to make sure the "primary" limit switch for each function trips before its "backup" limit switch. Listed below are the "primary" and then "backup" limit switches for the functions which have two limit switches. **Auto Exit function** ***"primary"*** - Back Up limit switch ***"backup"*** - internal limit switch for Back Up **Auto Operate function** ***"primary"*** - are the Base Up Program limit switch and Back Down Program limit switch ***"backup"*** - are the Base Up limit switch and internal limit switch for Back Down	Adjust the "primary" limit switch so it trips before the "backup" limit switch. Refer to various limit switch adjustments.

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Problem	Symptom	Probable Cause	Check	Correction
Chair moves fine for light patient, but will not move or moves slowly for very heavy patient	Heavy patients cause chair to malfunction.	Chair overloaded with too heavy of a patient.	Maximum weight capacity is 325 lbs (147.4 kg).	Inform chair operator of weight limitation.
		Low voltage is being supplied to chair.	Check voltage at wall receptacle - should be between 110.0 to 126.0 VAC on 115 VAC units or 220 to 252 VAC on 230 VAC units.	Correct low voltage situation at wall receptacle.
		Capacitor for suspect function is weak.	Replace suspect capacitor with known working capacitor.	Replace base capacitor (refer to para 4.3) or back capacitor (refer to para 4.8).
		Motor screw threads are dry or dirty, causing friction.	Check for foreign matter and lack of lubricant on screw threads.	Clean all foreign matter off of screw threads. Coat threads with STP treatment oil or equivalent. If motor is still lacking power, replace it.
Motor is exceedingly noisy.	Noisy motor.	Foreign matter on screw threads and / or lack of lubricant.	Check for foreign matter and lack of lubricant on screw threads.	Clean all foreign matter off of screw threads. Coat ball threads with STP treatment oil or equivalent. If motor is still noisy, replace it.
Headrest is difficult to adjust or does not stay in position.	Excessive force is required to position the headrest.	Headrest slide is too tight and needs adjusted.	Check adjustment of headrest slide.	Adjust the headrest slide assembly. Refer to para 4.19.
	Headrest does not lock into a position or slides downward on own.	Headrest slide is too loose and needs adjusted.	Check adjustment of headrest slide.	Adjust the headrest slide assembly. Refer to para 4.19.
Rotational base not working.	Brake is off, but chair top is binding when rotated.	Brake is out of adjustment (needs loosened).	Check adjustment of brake.	Adjust brake. Refer to para 4.18.
	Brake lever is difficult to engage.	Brake is out of adjustment (needs loosened).	Check adjustment of brake.	Adjust brake. Refer to para 4.18.
	Chair top can still be rotated when BRAKE lever is in locked position.	Brake is out of adjustment (needs tightened).	Check adjustment of brake.	Adjust brake. Refer to para 4.18.
Armrest is not working properly.	Armrest is hard to raise, rotate, or will not lock into place when returned to normal armrest position.	There is dirt, burrs, corrosion, or foreign matter in the armrest bearing or armrest post.	Check for dirt, burrs, corrosion, or foreign matter in the armrest bearing.	Clean the armrest post and armrest bearing. Use crocus cloth or a file to remove any burrs.

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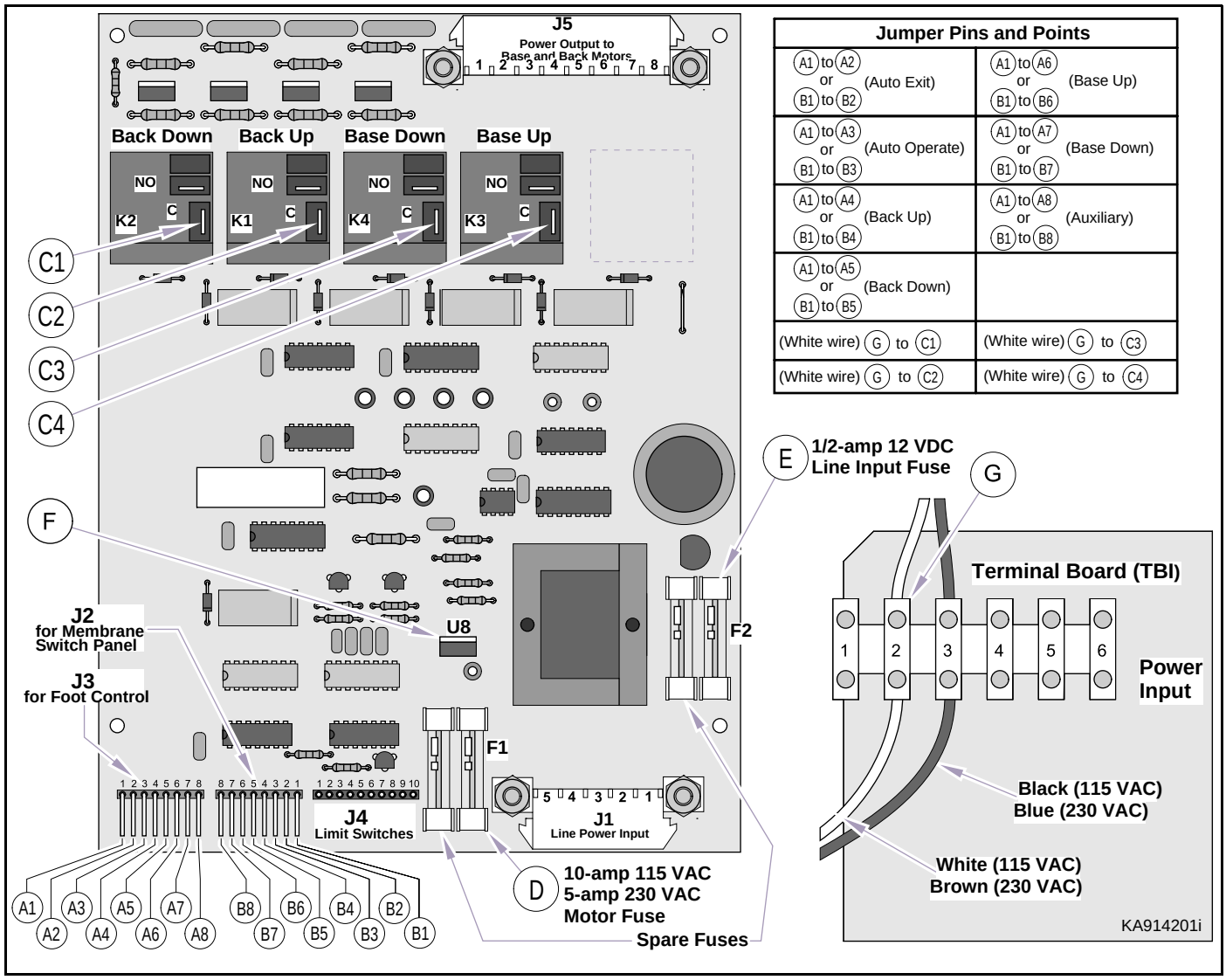

Jumper Pins and Points	
A1 to A2 or B1 to B2 (Auto Exit)	A1 to A6 or B1 to B6 (Base Up)
A1 to A3 or B1 to B3 (Auto Operate)	A1 to A7 or B1 to B7 (Base Down)
A1 to A4 or B1 to B4 (Back Up)	A1 to A8 or B1 to B8 (Auxiliary)
A1 to A5 or B1 to B5 (Back Down)	
(White wire) G to C1	(White wire) G to C3
(White wire) G to C2	(White wire) G to C4

Figure 2-2. Troubleshooting 115 or 230 VAC System P.C. Board and Terminal Board

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SECTION III
SCHEDULED MAINTENANCE

3.1 Scheduled Maintenance

Table 3-1 is a Scheduled Maintenance Chart which lists inspections and services that should be performed periodically on the chair. These inspections and services should be performed as often as indicated in the chart.

Interval	Inspection or Service	What to Do
Semi-annually	Obvious damage	Visually check condition of chair for obvious damage such as: cracks in components, missing components, dents in components, or any other visible damage which would cause chair to be unsafe to operate or would compromise its performance. Repair chair as necessary.
	Fasteners / hardware	Check chair for missing or loose fasteners / hardware. Replace any missing hardware and tighten any loose hardware as necessary.
	Warning and instructional decals	Check for missing or illegible decals. Replace decals as necessary.
	Pivot points / moving parts / accessories	Lubricate all exposed pivot points, moving parts, and accessories with silicone based lubricant.
	Membrane switch panels	Check each switch on both membrane switch panels for proper operation. Depress each membrane switch to make sure selected function operates. If any switch does not work, replace membrane switch panel. Refer to para 4.15.
	Foot control	Check each switch on foot control for proper operation. Depress each foot control switch to make sure selected function operates when its button is depressed. If any switch does not work, replace malfunctioning switch. Refer to para 4.16 or 4.17.
	Base and Back motors	Check both motors for proper operation in up and down directions. If motor makes excessive noise, clean all foreign matter off screw threads and coat threads with STP treatment oil or equivalent. If motor is weak or hums, replace its capacitor. Refer to para 4.3 thru para 4.8.
	Headrest slide mechanism	Check headrest slide mechanism for proper operation by sliding headrest up and down. Headrest should not take excessive force to move but should require a slight force to begin movement. If necessary, adjust headrest slide assembly. Refer to para 4.19.
	Rotation bearing	Check rotation bearing for proper operation. Unlock brake and rotate chair top. Chair top should rotate smoothly and easily 45° in each direction from centerline of chair. If binding occurs, adjust brake. Refer to para 4.18. Move footrest release lever to brake position and attempt to rotate chair top. Chair top should not be able to be moved. If necessary, adjust brake. Refer to para 4.18.
	Armrest	Check armrest. Rotate it to the side and back to its normal position. If armrest is hard to rotate, or will not lock into place, clean armrest post and bearing. Use crocus cloth or a file to remove any burrs. Coat post and bearing with silicone based lubricant.
	Limit switches.	Check to make sure “primary” limit switch for each function trips before its “backup” limit switch. Listed below are“primary” and “backup” limit switches for each function. **Auto Exit function** ***“primary”*** - Back Up limit switch ***“backup”*** - Internal (motor) limit switch for Back Up **Auto Operate function** ***“primary”*** - Base Up Program limit switch and Back Down Program limit switch ***“backup”*** - Base Up limit switch and internal (motor)l limit switch for Back Down **Back Up function** ***“primary”*** - Back up limit switch ***“backup”*** - Internal (motor) limit switch for Back Up **Back Down function** ***“primary”*** - Internal (motor) limit for Back Down ***“backup”*** - None **Base Up function** ***“primary”*** - Base up limit switch ***“backup”*** - None **Base Down function** ***“primary”*** =Base down limit switch ***“backup”*** = None **NOTE:** If necessary, adjust a ***“primary”*** limit switch to trip *before* a ***“backup”*** limit switch.

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SECTION III
SCHEDULED MAINTENANCE

Interval	Inspection or Service	What to Do
	Safety Bail Limit Switches	Test both Safety Bail Limit switches to assure they function, stopping the chair's descent in Auto Exit and Base Down modes. Press upward on the bottom lift arm cover during the descent. If descent continues adjust or replace malfunctioning limit switch(es). Refer to para 4.14).
	Upholstery	Check all upholstery for rips, tears, or excessive wear.
	Accessories	Check that all accessories have all of their components and that they function properly.
	Operational Test	Perform an Operational Test to determine if the chair is operating within its specifications (Refer to para 2.1). Replace or adjust any malfunctioning components.

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SECTION IV
MAINTENANCE / SERVICE INSTRUCTIONS

4.1 Introduction

WARNING
Refer to Operator Manual for complete instructions on operating the dental chair. Failure to do so could result in personal injury.

NOTE
Perform an operational test on the dental chair after repair is completed to confirm repair was properly made and that all malfunctions were repaired.

The following paragraphs contain removal, installation, repair, and adjustment procedures for the dental chair.

4.2 Upholstery

A. Removal

(1) Raise chair up to its highest position and recline the back to 45°.

(2) Move headrest (1, Figure 4-1) assembly upward.

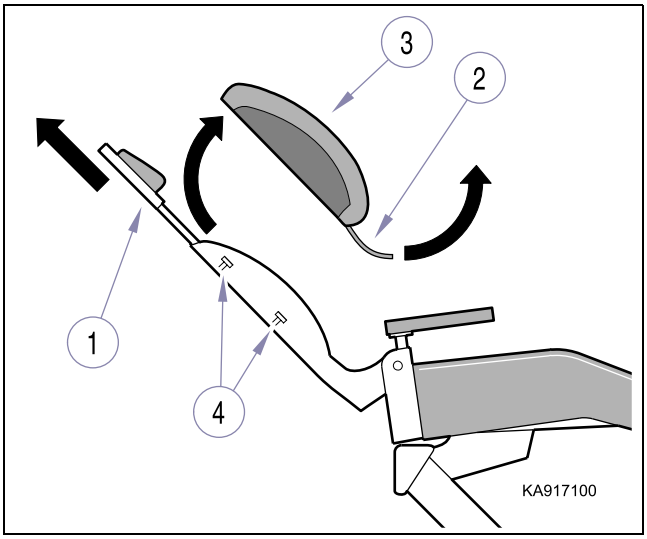

Figure 4-1. Upholstery

(3) Pull upward on back cushion skirt (2) to separate velcro on skirt from velcro on chair back.

(4) Pull upward on chair back cushion (3) to release it from mounting studs (4) on back and remove cushion.

(5) Using a 3/8" socket, remove four screws (1, Figure 4-2) that secure hinges (2) to seat cushion (3) and remove cushion.

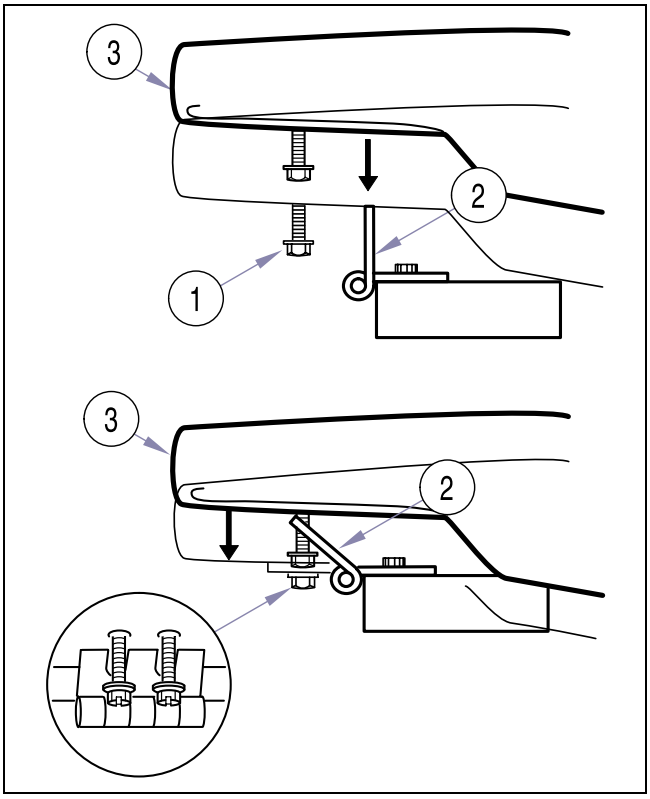

Figure 4-2. Upholstery

B. Installation

(1) Install four screws (1, Figure 4-2) in bottom of seat and hand tighten two turns.

(2) Place two hinges (2) up into a vertical position and lower seat cushion (3) onto chair so it rests on hinges (2).

(3) Rotate hinges (2) downward toward screws (1) allowing screws to slide into slots of hinges (2).

(4) Tighten four screws (1).

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4.3 Base Capacitor

A. Removal

WARNING
Unplug chair power cord from wall outlet before removing covers or working on chair. Failure to comply could result in personal injury.

(1) Unplug chair power cord.

(2) Remove R.H. (1, Figure 4-3) and L.H. (2) base covers (three screws each).

(3) Remove center base cover (3) (four screws).

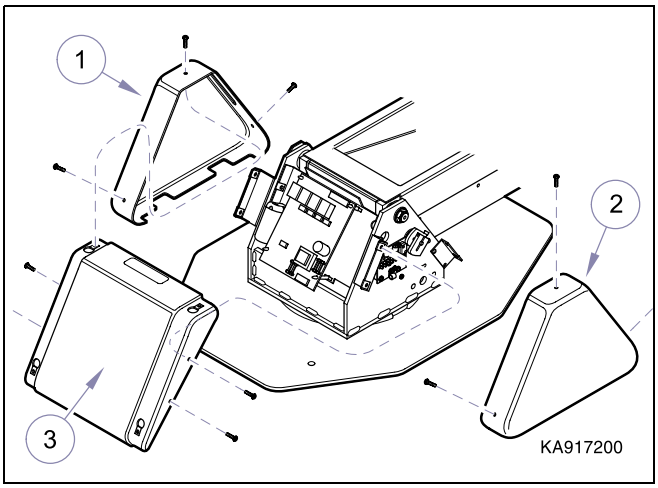

Figure 4-3. Base Motor Capacitor

(4) Using a screwdriver, pry up on tab (A, Figure 4-4) of mounting bracket (1) and remove capacitor (2).

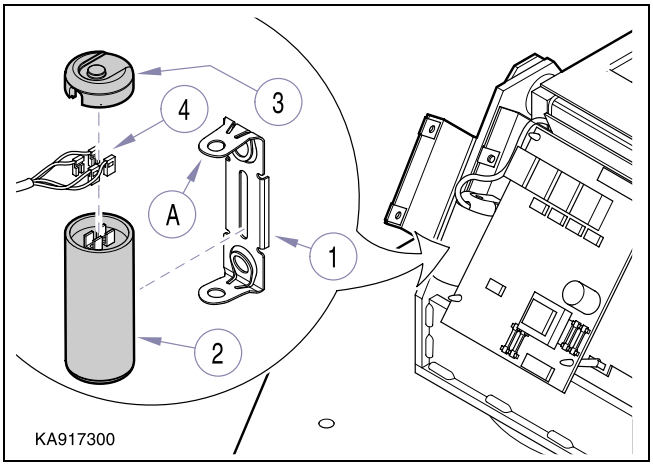

Figure 4-4. Base Motor Capacitor

(5) Remove cap (3) from capacitor (2).

WARNING
Using a screwdriver with an insulated handle, jumper across capacitor terminals to discharge capacitor before touching terminals or wires. Failure to comply could result in serious personal injury.

(6) Discharge capacitor (2).

(7) Tag and disconnect four wires (4) and remove capacitor (2).

B. Installation

(1) Connect four wires (4, Figure 4-4) to capacitor (2).

(2) Install capacitor cap (3).

(3) Position capacitor (2) on mounting bracket (1) making sure capacitor is held firmly in place with tabs of bracket.

(4) Install center base cover (3, Figure 4-3) on mounting brackets and secure with four screws.

(5) Install L.H. (2) and R.H. (1) base cover on center base cover (3) (three screws each).

(6) Plug chair power cord into wall outlet and check operation.

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4.4 Base Motor

A. Removal

WARNING
Rotate chair so it is aligned straight on base and engage the brake to prevent movement. If there are chair mounted accessories, assure they are folded inward, over chair, to prevent side loading during base motor removal and assembly procedures.

(1) Align chair on base, engage brake, and, if necessary, fold any chair mounted accessories inward, over chair.

(2) Unplug chair power cord.

(3) Remove R.H. (1, Figure 4-5) and L.H. (2) base covers (three screws each).

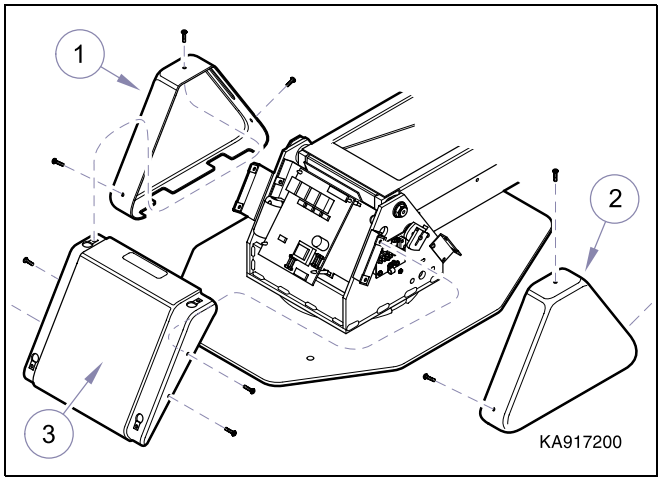

Figure 4-5. Base Motor Removal

(4) Remove center base cover (3) (four screws).

(5) Remove R.H. (1, Figure 4-6), Center (2) and L.H. (3) platform covers (4 screws).

(6) Pull outward on one corner of bottom lift arm cover (4) until it clears standoff (5). Repeat step for other corner and remove cover (4).

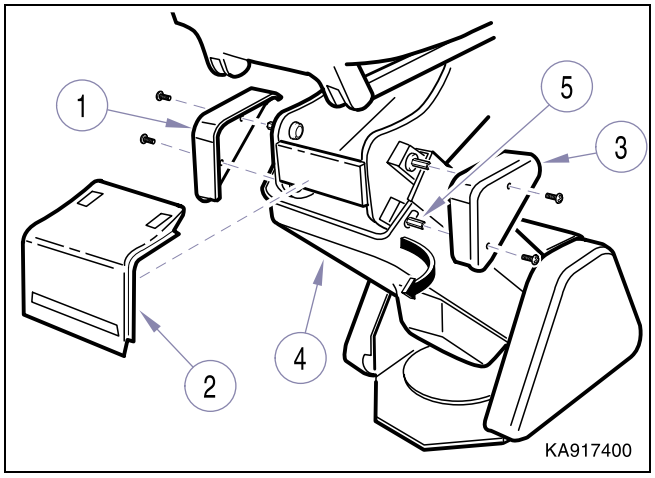

Figure 4-6. Base Motor Removal

(7) ***If base motor <u>is</u> operable:***

a. Plug chair power cord into wall outlet.

b. Raise BASE UP function all the way up.

DANGER
Make sure that chair top is securely supported before starting to remove base motor. Failure to do so could result in chair top collapsing which could cause serious personal injury or death.

NOTE
Run base motor until top support just rests against wood supports. Do ***<u>not</u>*** draw chair down so base motor is binding against wood supports.

c. Position <u>two</u> wood 2 x 4's (18" long [45.7 cm]) (1, Figure 4-7) beneath top support (2) , then lower chair so it ***<u>barely</u>*** rests on the wood supports.

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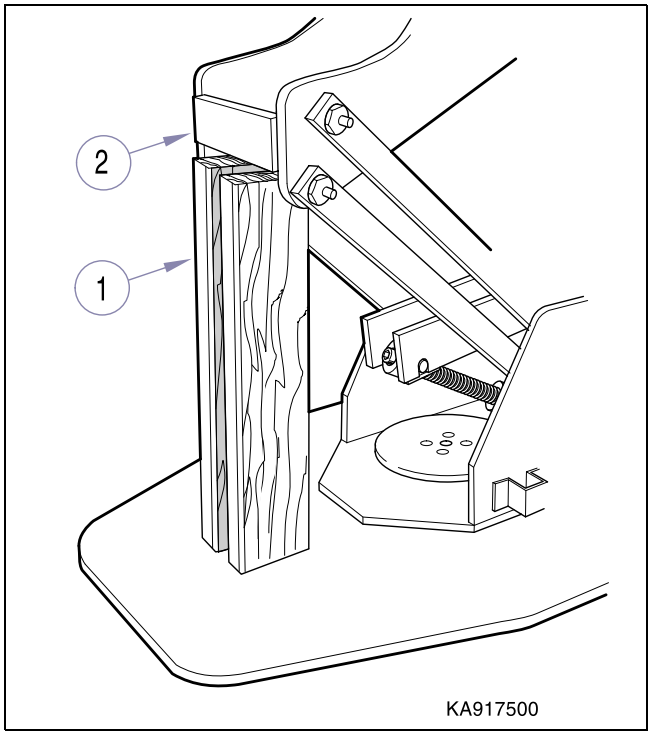

Figure 4-7. Base Motor Removal

d. Remove four screws (1, Figure 4-8), lockwashers (2), and trunnion retainer plate (3) from frame (4).

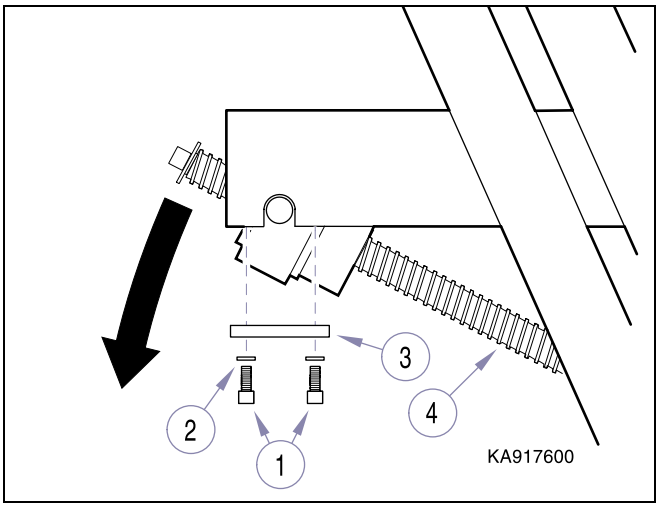

Figure 4-8 Base Motor Removal

e. Carefully lower chair onto wood supports, until motor shaft and trunnion block disengages (5) from frame (4).

WARNING
Disconnect the power from the chair. Failure to comply could result in personal injury.

f. Disconnect power supply to chair.

g. Remove mounting brackets (1, Figure 4-9) (four screws).

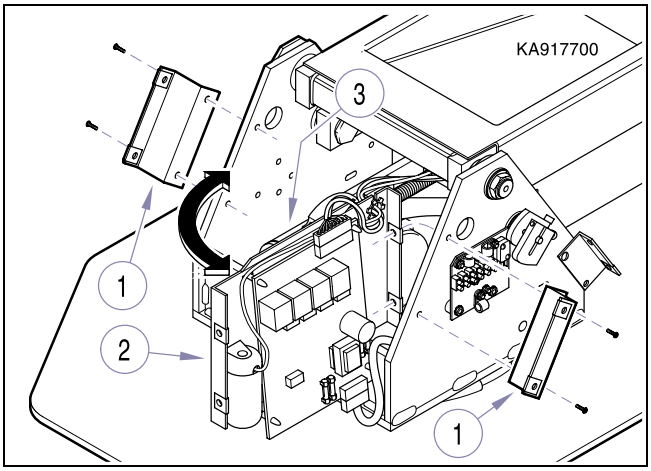

Figure 4-9. Base Motor Removal

NOTE
Cut any cable ties or remove any cables from cable clamps which are restricting movement of mounting plate (2) when its left side is being pulled outward.

h. Carefully pull outward on left side of mounting plate (2) and position plate so base motor (3) can be accessed.

i. Unplug base motor wire harness (1, Figure 4-10) and disconnect cable clamp (2) from base.

j. Remove one of the retaining rings (3) and the pin (4) securing clevis (5) to base mounting bracket (6).

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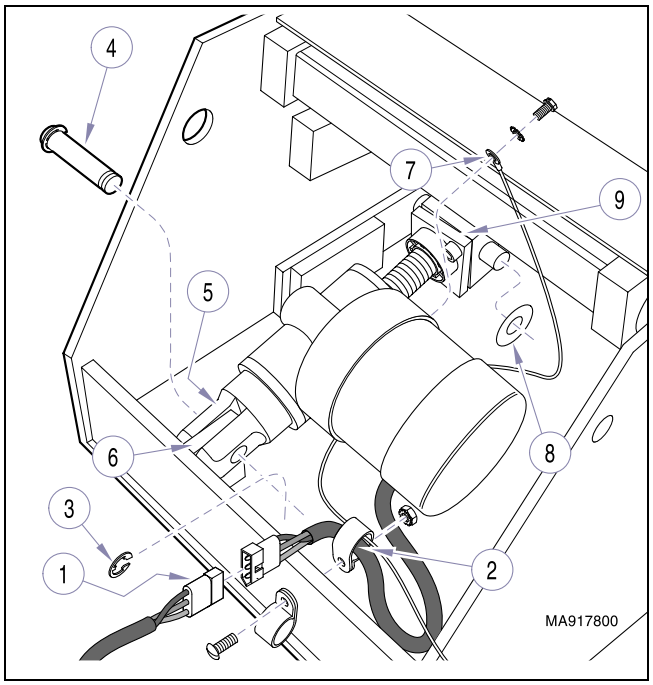

Figure 4-10. Base Motor Removal

k.. Remove ground wire (7) from motor (one screw and lockwasher).

l. Remove two washers (8); one from each side of trunnion (9).

m. Remove four screws (1, Figure 4-8), lock-washers (2), and trunnion retainer plate (3) from the frame (4), then remove motor assembly.

(8) ***If base motor <u>is not</u> operable:***

WARNING
Disconnect the power from the chair. Failure to comply could result in personal injury.

a. Disconnect power supply to chair

b. Remove mounting brackets (1, Figure 4-9) (four screws).

NOTE
Cut any cable ties or remove any cables from cable clamps which are restricting movement of mounting plate (2) when its left side is being pulled outward.

c. Carefully pull outward on left side of mounting plate (2) and position plate so base motor (3) can be accessed.

d. Unplug base motor wire harness (1, Figure 4-10) and disconnect cable clamp (2) from base.

e. Remove one of the retaining rings (3) and the pin (4) securing clevis (5) to base mounting bracket (6).

f.. Remove ground wire (7) from motor (one screw and lockwasher).

g. Remove two washers (8); one from each side of trunnion (9).

DANGER
Make sure that chair top is securely supported before starting to remove base motor. Failure to do so could result in chair top collapsing which could cause serious personal injury or death.

EQUIPMENT ALERT
Do <u>not</u> apply pressure to top support with jack until after base motor has been disconnected from base mounting bracket or damage could occur to motor assembly.

h. Place a jack (1, Figure 4-11) beneath top support (2) to support it while removing base motor.

l. Using jack (1), elevate chair to access shaft end of motor assembly.

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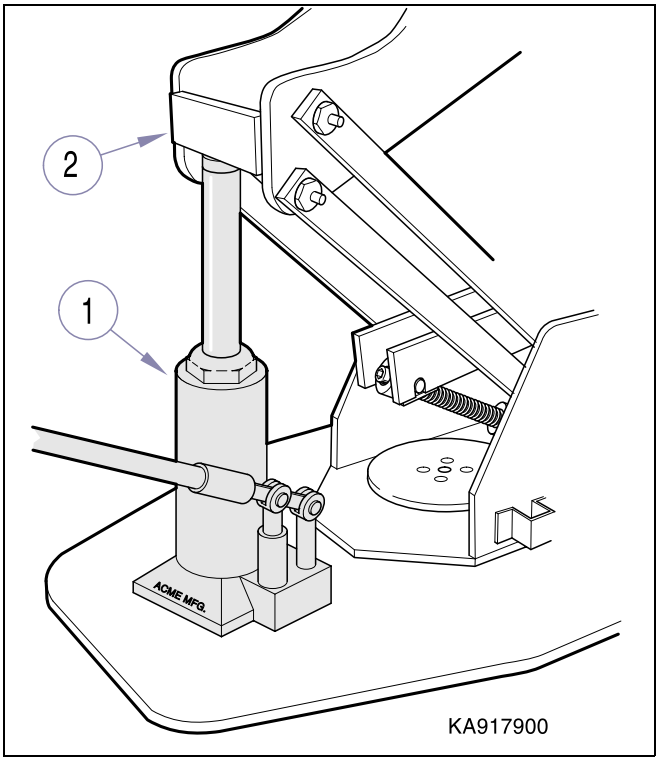

Figure 4-11. Base Motor Removal

m. Remove four screws (1, Figure 4-8), lock-washers (2), and trunnion retainer plate (3) from the frame (4), then remove motor assembly.

B. Installation

(1) Install two nylon washers (8, Figure 4-10); one on each side of trunnion (9).

NOTE
If new base motor comes with a ground wire, remove it and use the existing ground wire on chair.

(2) Attach ground wire (7) to base motor (one screw and washer).

(3) Attach clevis of base motor (5) to mounting bracket (6) with pin (4) and two retaining rings (3).

(4) Connect base motor wire harness to wire harness (1).

(5) Install cable clamp (2) (one screw and nut).

(6) Place p.c board mounting plate (1, Figure 4-12) back in position and install mounting brackets (2) (four screws).

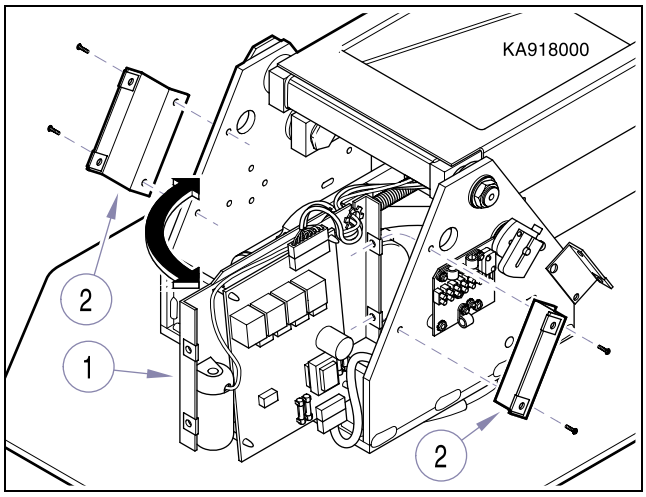

Figure 4-12. Base Motor Installation

WARNING
***Carefully* jog BASE UP so trunnion moves just enough to insert into slot of support bracket. Do not remove wood supports until trunnion brackets have been securely installed.**

(7) *Carefully* jog BASE UP function while guiding trunnion arms (A, Figure 4-13) into trunnion slots (B). Make sure trunnion arms are fully seated in trunnion slots.

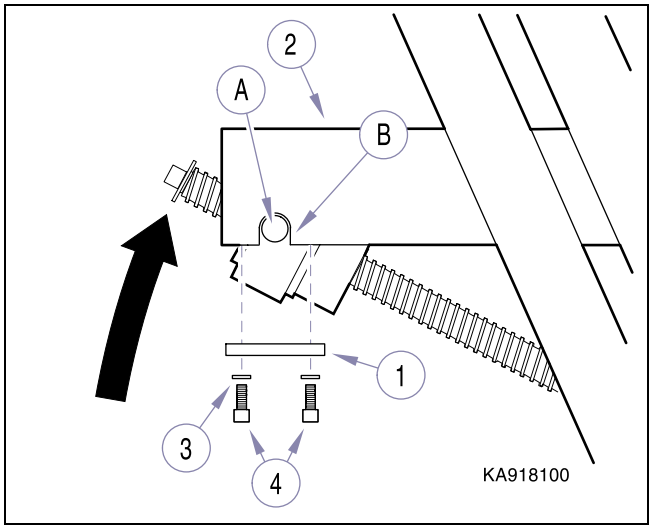

Figure 4-13. Base Motor Installation

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(8) Install trunnion retainer plate (1, Figure 4-13) on scissors assembly (2) and secure with four lockwashers (3) and screws (4).

(9) Raise BASE UP function all the way up and remove wood supports.

(10) Pull outward on one corner of upper arm cover (1, Figure 4-14); then install bottom lift arm cover (2) on standoff (3), making sure cutout (A) is mounted on scissors joint (B). Repeat step for other corner of bottom lift cover.

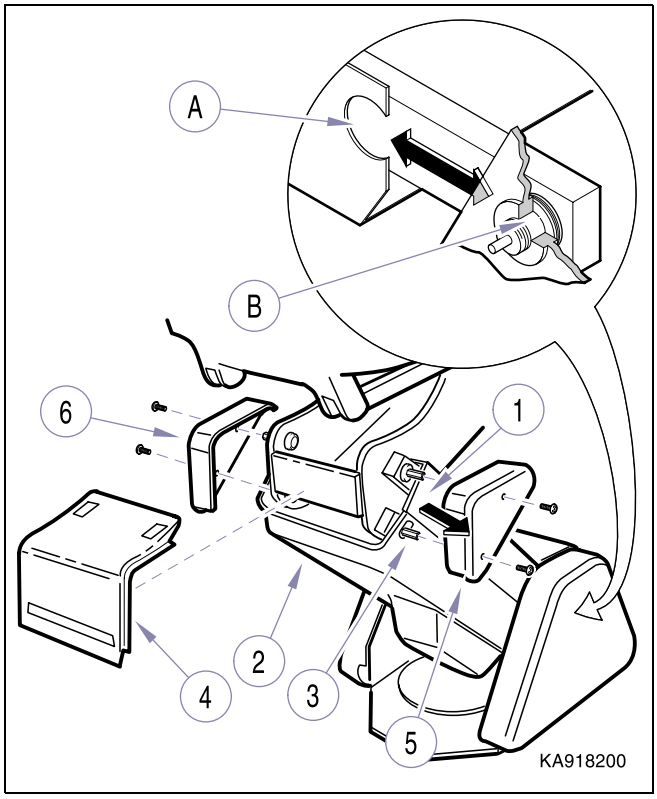

Figure 4-14. Base Motor Installation

(11) Install center (4), R.H. (5) and L.H. (6) platform covers (four screws).

(12) Install center base cover (1, Figure 4-15) (four screws).

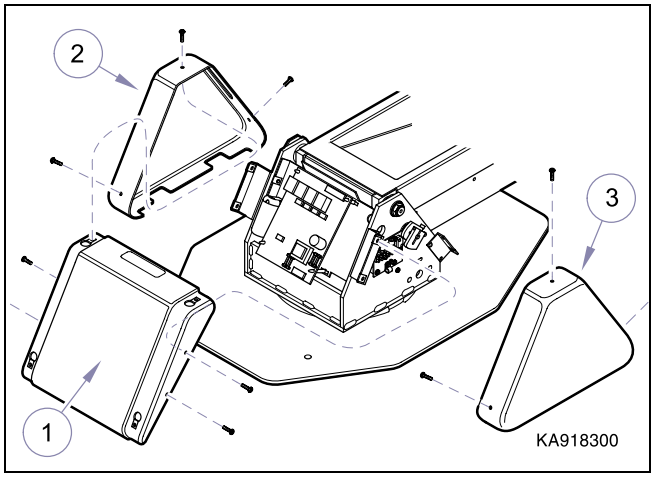

Figure 4-15. Base Motor Installation

(13) Install R.H. (2) and L.H. (3) base covers (six screws).

(14) Plug chair power cord into wall outlet.

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4.5 Base Motor Worm Gear

A. Removal

(1) Remove base motor (Refer to para 4.4).

(2) Using a 3mm Allen Wrench, remove two set-screws (1, Figure 4-16) and then unscrew clevis (2) from motor housing (3).

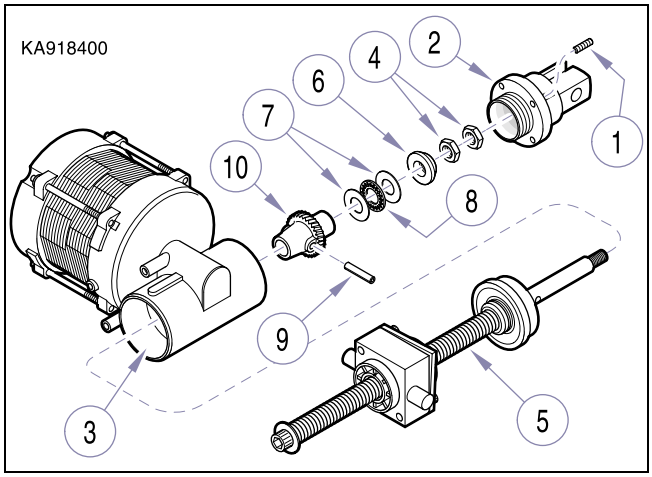

Figure 4-16. Base Worm Gear

(3) Remove two nuts (4) from screw shaft (5).

(4) Using a rubber mallet, gently drive screw shaft (5) out of motor housing (3).

(5) Remove retaining ring (6), two bearing races (7), and bearing (8) from motor housing (3).

(6) Using a 3/16" punch and hammer, drive out roll pin (9) and remove worm wheel (10) from screw shaft (5).

(7) Inspect inside motor housing (3) for broken worm wheel pieces, metal shavings, or any other foreign debris. Remove any debris. Inspect screw shaft (5) for burrs. Remove any burrs with a file.

B. Installation

(1) Install worm wheel (10, Figure 4-16) on screw shaft (5) and then, using a hammer and 3/16" punch, secure with roll pin (9), making sure ends of roll pin are flush with worm wheel.

NOTE
There may be excess grease in the motor housing which may be used for the following step.

(2) Coat surfaces of two bearing races (7), bearing (8), and worm wheel (10) with high temperature bearing grease.

(3) Insert screw shaft (5) into motor housing (3) as far as possible by hand. Then, using a rubber mallet, gently tap screw shaft (5) in until fully seated in motor housing.

(4) Install one bearing race (7), bearing (8), one bearing race (7), and retaining ring (6) on end of screw shaft (5).

(5) Coat threads of two nuts (4) with removable threadlocking adhesive (Loctite 242).

EQUIPMENT ALERT
Do *not* over-tighten lock nuts on screw shaft.

(6) Install first nut (4) on screw shaft (5) and tighten until finger tight. Then, using a wrench, tighten nut 1/4 additional turn.

(7) Install second nut (4) on screw shaft (5) until finger tight. Then, while holding first nut (4) in place, tighten second nut against first nut.

(8) Screw clevis (2) into motor housing (3) and tighten until finger tight. Then, unscrew clevis slightly until the next closest two setscrew (1) holes are aligned with setscrew holes on motor housing (3). Secure clevis in this position with two setscrews (1).

(9) Install base motor (Refer to para 4.4).

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4.6 Base Motor Trunnion

A. Removal

(1) Remove the base motor (refer to para 4.4).

(2) Using an 8mm allen wrench, remove the socket head screw, flat washer, and lock washer (1, Figure 4-17) from motor shaft (2).

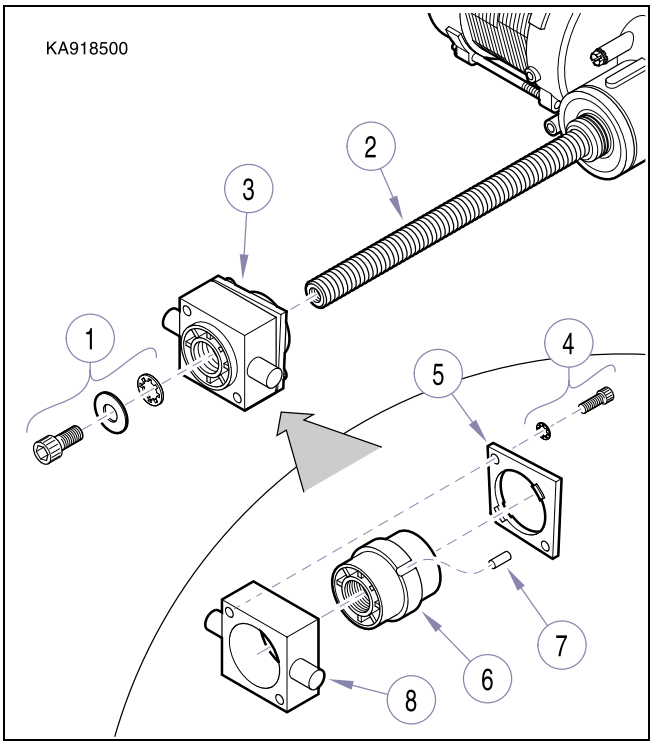

Figure 4-17. Base Motor Trunnion

(3) Unscrew the trunnion assembly (3) from the motor shaft (2).

B. Disassembly

(1) Using a 3/16” allen wrench, remove the two socket head set screws and lock washers (4, Figure 4-17) and remove the trunnion plate (5).

(2) Separate the drive nut (6), pin (7) and, trunnion block (8).

C. Assembly

(1) Place the drive nut (6, Figure 4-17) into the trunnion block (8) and install the pin (7).

NOTE
The trunnion plate (5) is intentionally deformed in order to apply pressure to the drive nut (6).

(2) Place trunnion plate (5) onto trunnion block (8) and secure with two socket head screws and lock washers (4).

D. Installation

EQUIPMENT ALERT
Trunnion plate (5, Figure 4-16) must face toward the motor when installing trunnion assembly (3) on motor shaft (2).

(1) Install trunnion assembly (3) on motor shaft (2).

(2) Install socket head screw, flat washer, and lock washer (1) onto motor shaft (2).

EQUIPMENT ALERT
Lubricate both studs on trunnion block and motor shaft with an extreme pressure lubricant such as Magnalube-G Teflon Lubricant or equivalent.

(3) Install base motor (Refer to para 4.4).

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4.7 Back Motor

A. Removal

(1) Unplug chair power cord.

(2) Remove seat upholstery (1, Figure 4-18) by loosening four screws (2) that secure seat upholstery to seat hinges (3).

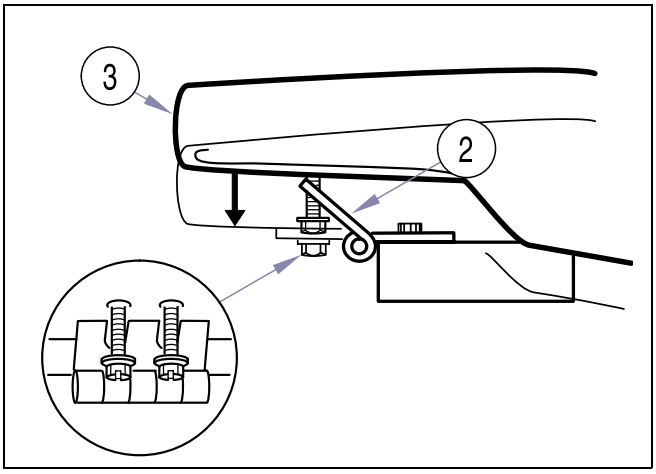

Figure 4-18. Back Motor

(3) Disconnect motor wire harness (1, Figure 4-19) from wire harness.

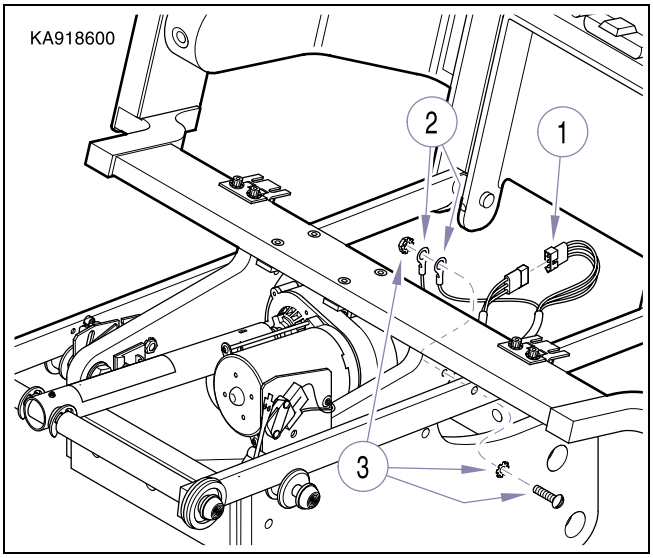

Figure 4-19. Back Motor

(4) Remove two ground wires (2) by removing locknut, screw and lockwasher (3) from frame.

WARNING
Be sure Back section is supported before disconnecting Back Motor assembly. Failure to comply may result in personal injury.

(5) While supporting back section, remove two push nut caps (1, Figure 4-20), two leg support rollers (2), two small retaining rings (3), and two large E-clips (4) on tow bar shaft (5).

(6) Loosen set screw (6) that secures motor actuator tube (A) to tow bar shaft (5).

(7) Separate tow bar shaft (5) from seat support bar assemblies (7).

(8) While supporting back motor assembly (8), remove four screws and lock washers (9) and remove back motor assembly.

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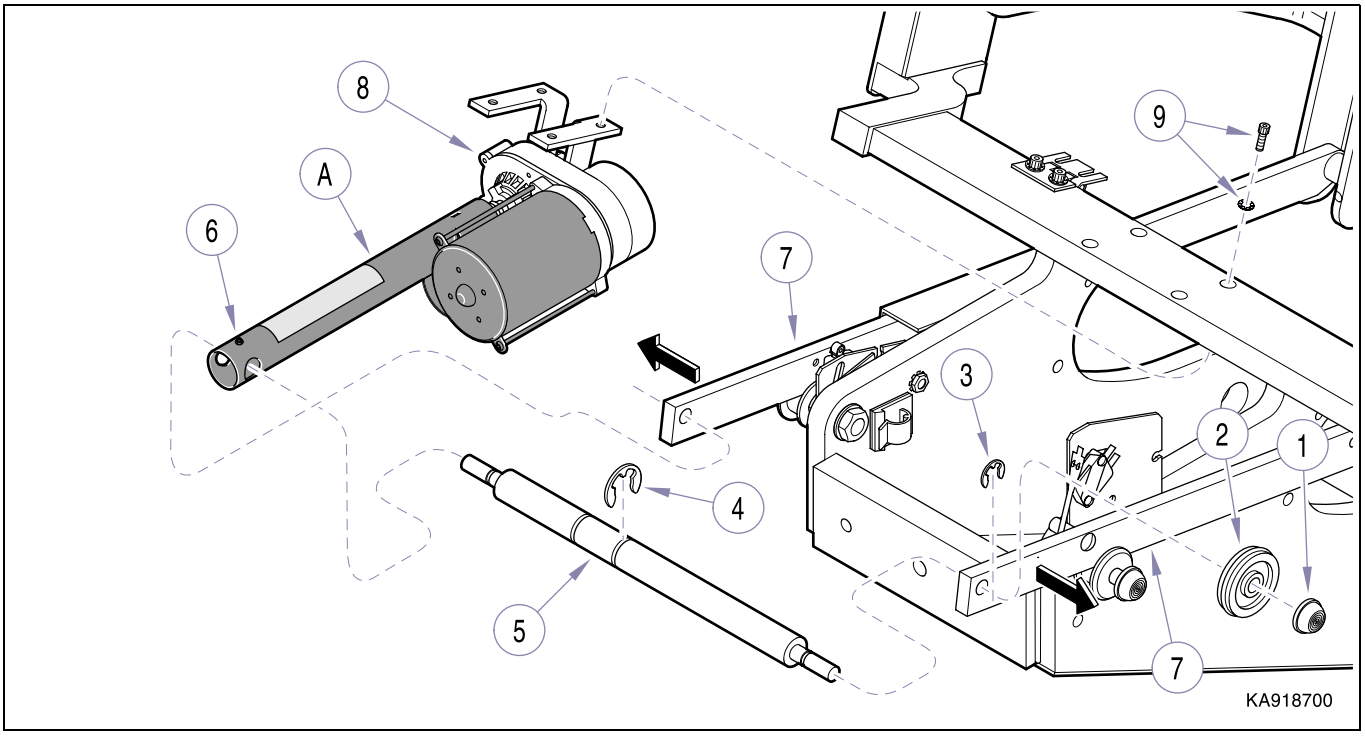

Figure 4-20 Back Motor

(9) Remove two E-clips, (1, Fig. 4-21), top motor pin (2), spacer (3), and R.H. (4) and L.H. (5) motor mount brackets.

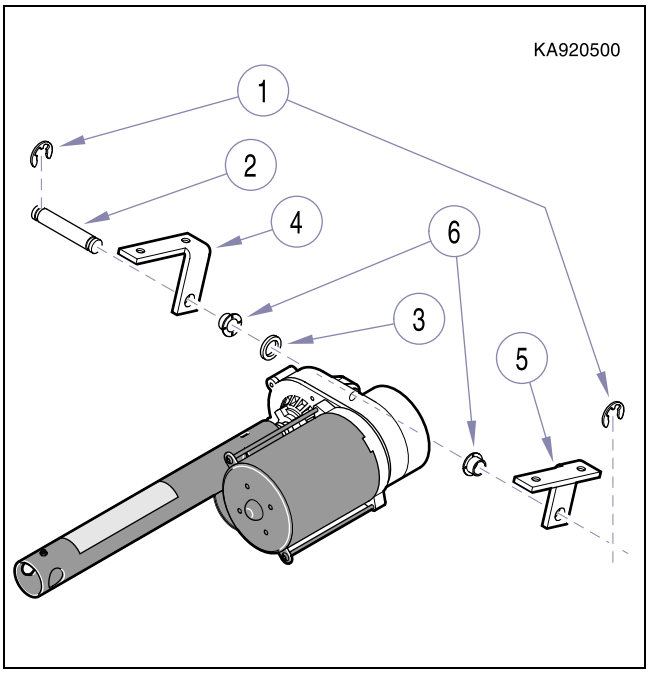

Figure 4-21. Back Motor

B. Installation.

NOTE
Assure R.H. (4, Figure 4-21) and L.H. (5) motor mount brackets are positioned correctly on motor during installation. Spacer (3) can be installed on either side of bracket of motor. If necessary, install new nyliner bearings (6) in mounting brackets.

(1) Place R.H. (4, Figure 4-21) and L.H.(5) motor mount brackets in position and install top motor pin (2), spacer (3) and E-clips (1)>

(2) Connect motor wire harness (1, Figure 4-19) to mating chair wire harness.

(3) Plug chair power cord into wall outlet receptacle.

(4) Run BACK UP function until back motor is stopped by motor's internal limit switch.

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(5) Unplug chair power cord.

NOTE
When adjusting distance between actuator tube (1, Figure 4-22) and motor assembly (2) do not turn motor shaft (3).

(6) Manually adjust actuator tube (1, Figure 4-22) by rotating it toward motor assembly (2) until **5 threads** on motor shaft (3) are visible.

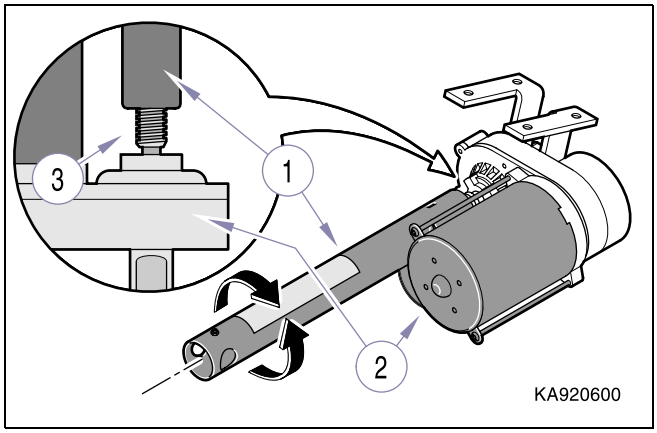

Figure 4-22. Back Motor

(7) Position motor assembly in chair and connect two ground wires (2, Figure 4-19) to frame with lockwasher, screw, and locknut (3).

(8) Supporting motor assembly (1, Figure 4-23), secure motor brackets (2) to chair support (3) with four screws and lockwashers (4).

NOTE
Hole for set screw, on end of actuator tube, must be facing upward for access during installation.

(9) Slide tow bar shaft (5) thru hole on end of actuator tube (6).

(10) Insert ends of tow bar shaft (5) into holes on ends of seat support bar assemblies (7) and install small retaining rings (8).

(11) Install large E-clips (9) on both sides of actuator tube (6) and tighten set screw and lock nut (10).

NOTE
Check condition of O-rings (A) on leg support rollers (11) and replace them if necessary.

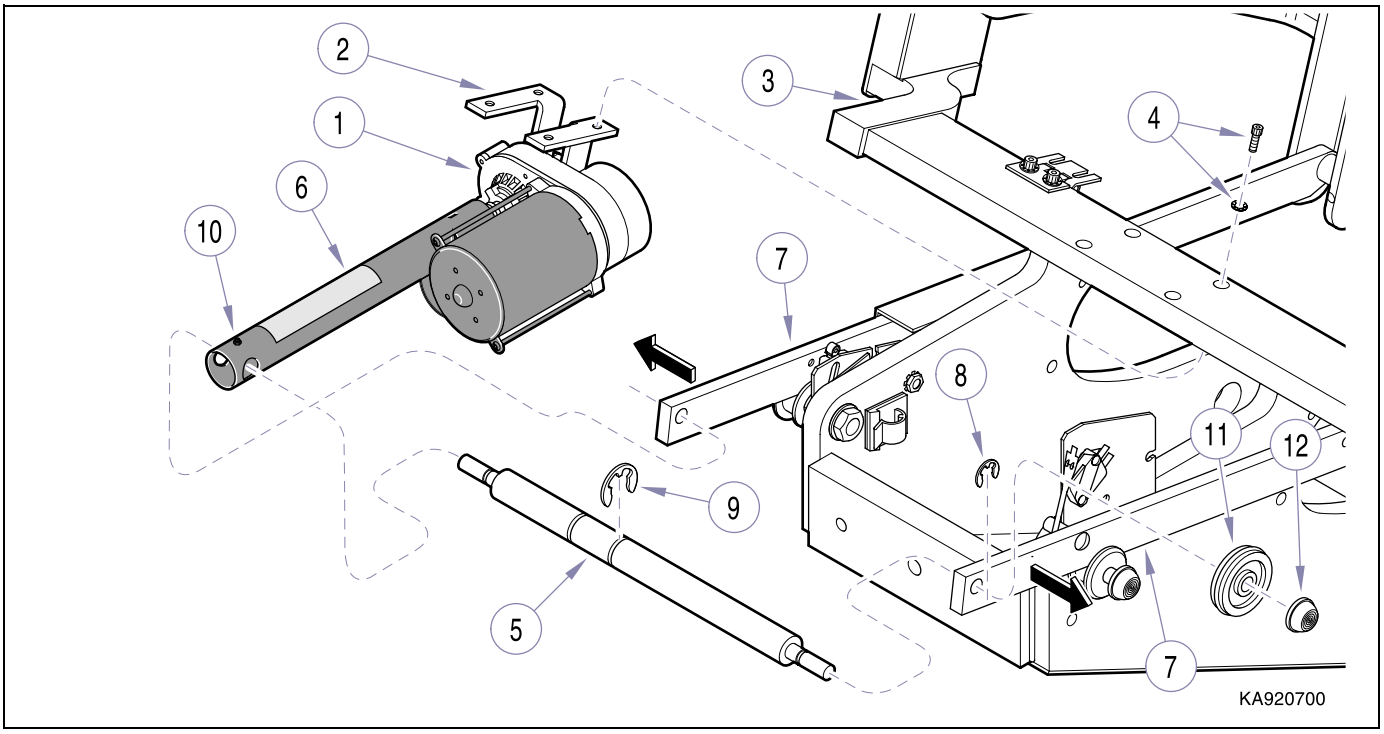

Figure 4-22. Back Motor

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(12) Lubricate both ends of tow bar shaft and install leg support rollers (11) and push nut caps (12).

EQUIPMENT ALERT
Assure all electrical leads are secured in existing cable clamps to prevent accidental cutting when chair is in operation.

(13) Plug the chair into outlet and check operation.

EQUIPMENT ALERT
Check to assure the internal motor limit switches (Back Up and Back Down) function correctly, stopping the motor at its extreme limits.

(14) Install upholstery (refer to para 4.2)

4.8 Back Motor Capacitor

A. Removal

(1) Remove Base Motor (refer to para 4.4)

(2) Remove capacitor cover (1, Figure 4-24) (two screws).

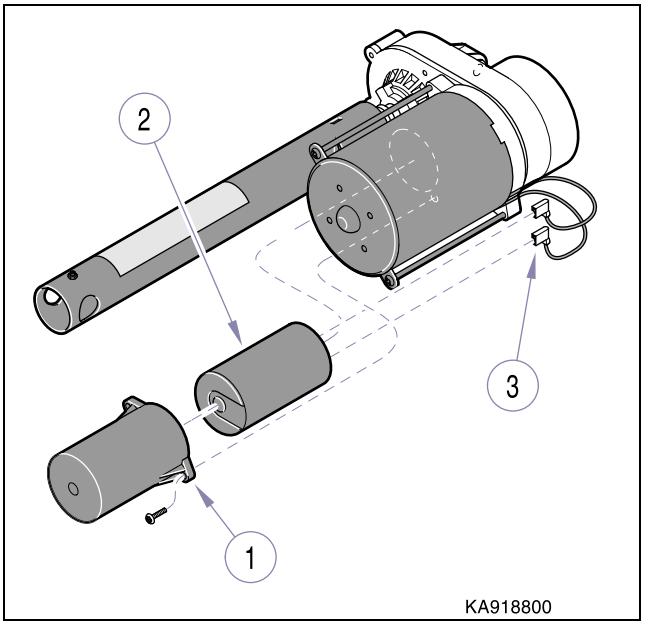

Figure 4-24. Back Motor Capacitor

WARNING
Using a screwdriver with an insulated handle, jumper across capacitor terminals to discharge capacitor before touching terminals or wires. Failure to comply could result in serious personal injury.

(3) Discharge capacitor (2).

(4) Disconnect leads (3) and remove capacitor (2).

B. Installation

EQUIPMENT ALERT
Assure capacitor being installed is of same microfarad (Mfd) and voltage rating as one being replaced.

(1) Connect electrical leads (3, Figure 4- 24) to capacitor (2).

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(2) Insert capacitor (2) into capacitor cover (1) and secure to base motor (two screws).

(3) Install Back Motor assembly on chair (refer to para 4.7).

4.9 Printed Circuit (PC) Board

A. Removal

(1) Unplug chair power cord.

(2) Remove R.H. (1, Figure 4-25) and L.H. (2) base covers (three screws each).

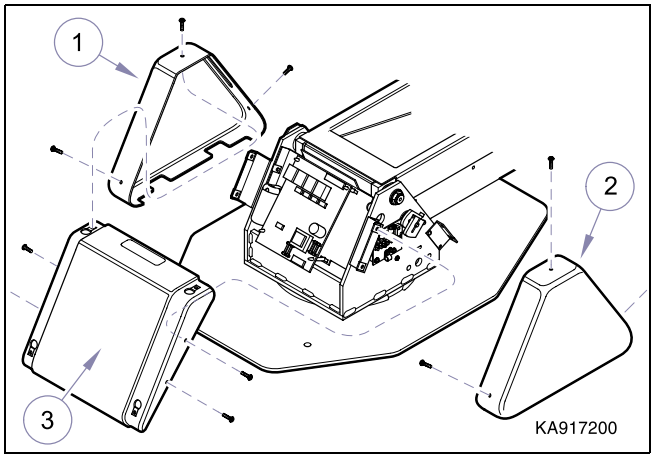

Figure 4-24. P.C. Board

(3) Remove center base cover (3) (four screws).

(4) Tag and disconnect foot control harness (1, Figure 4-26) and membrane panel harness (2) from PC circuit board (3).

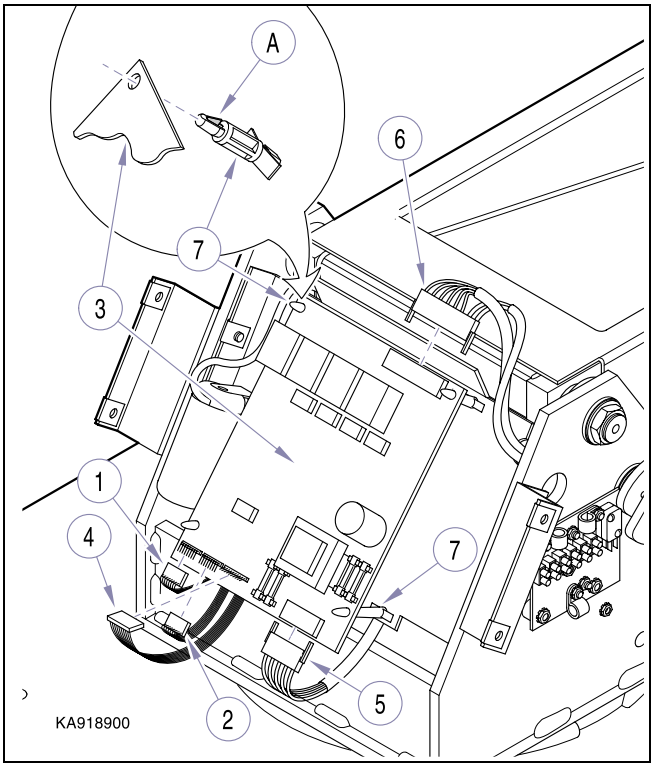

Figure 4-26. P.C. Board

(5) Disconnect limit switch harness (4), power harness (5), and motor harness (6) from PC circuit board (3).

(6) Using a screwdriver, depress locking tab (A) of standoff (7) while pulling upward on that corner of PC circuit board to release it. Repeat for three remaining standoffs (7) and remove PC circuit board (3).

B. Installation

(1) Inspect standoffs (7, Figure 4-26) and replace them if broken.

(2) Place PC board (3) in position on standoffs (7), pushing down to lock in place.

(3) Reconnect harnesses to their respective pin connections on PC board.

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(4) Install center base cover (3, Figure 4-25) on mounting brackets and secure with four screws.

(5) Install L.H. (2) and R.H. (1) base cover on center base cover (3) (three screws each).

(6) Plug chair power cord into wall outlet and check operation.

4.10 Base Up & Base Down Limit Switch

A. Removal

(1) Unplug chair power cord.

(2) Remove three screws (1, Figure 4-27) and L.H. base cover (2) from center base cover (3).

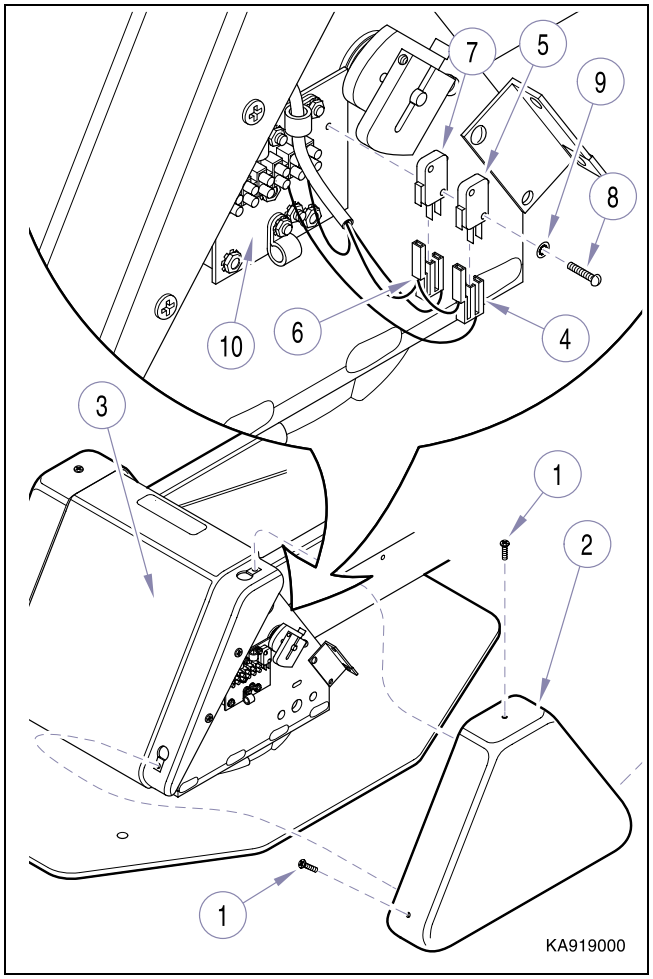

Figure 4-27

(3) Tag and disconnect connector (4) from base up limit switch (5).

(4) Tag and disconnect connector (6) from base down limit switch (7).

(5) Remove two screws (8), lockwashers (9), base up (5), and base down limit switch (7).

B. Installation

(1) Install base down limit switch (7, Figure 4-27) and base up limit switch (5) on electrical connection plate (10) and secure with two lockwashers (9) and screws (8).

(2) Connect connector (6) to base down limit switch (7).

(3) Connect connector (4) to base up limit switch (5).

C. Adjustment

(1) Remove right-hand base cover (2, Figure 4-27) (three screws).

(2) Remove L.H. (1, Figure 4-28), Center (2) and R.H. (3) platform covers (4 screws).

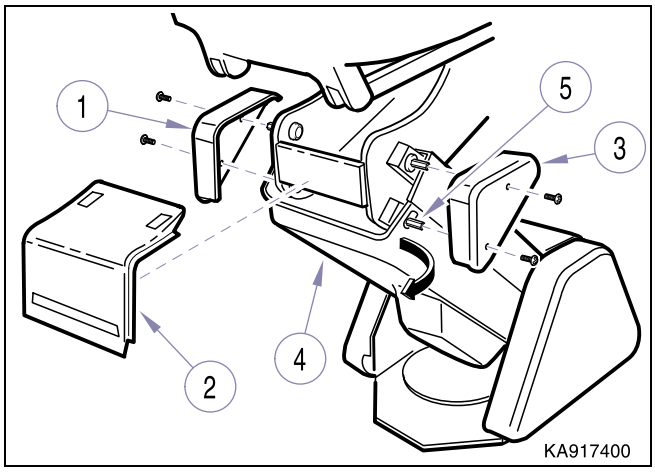

Figure 4-28. Base Up / Down Limit Switches

(3) Pull outward on one corner of bottom lift arm cover (4) until it clears standoff (5). Repeat step for other corner and remove cover (4).

WARNING
Limit switch cam adjustments must be done with table plugged in. Line voltage is present on terminal board near limit switches. Use care not to touch bare wires or terminals. Failure to comply could result in personal injury.

(4) Base Up Limit Switch Adjustment.

a. Loosen screw (1, Figure 4-29) and rotate cam (2) ***up*** off trip button (A) of Base Up limit switch (3).

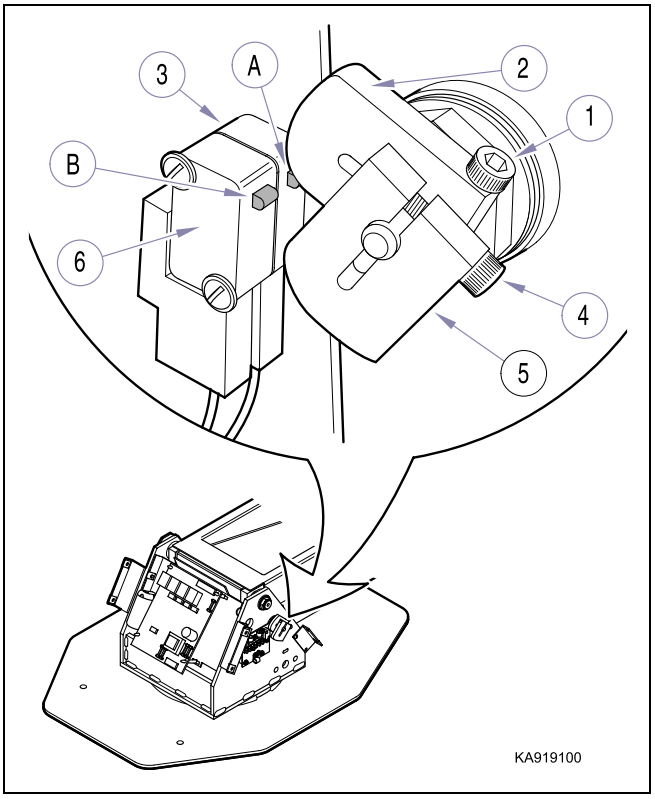

Figure 4-29. Base Up / Down Limit Switches

EQUIPMENT ALERT
When base motor reaches its limit, release Base Up control button *quickly*; motor is binding at this point and damage to motor could occur.

b. Raise Base Up function all the way up until motor stops.

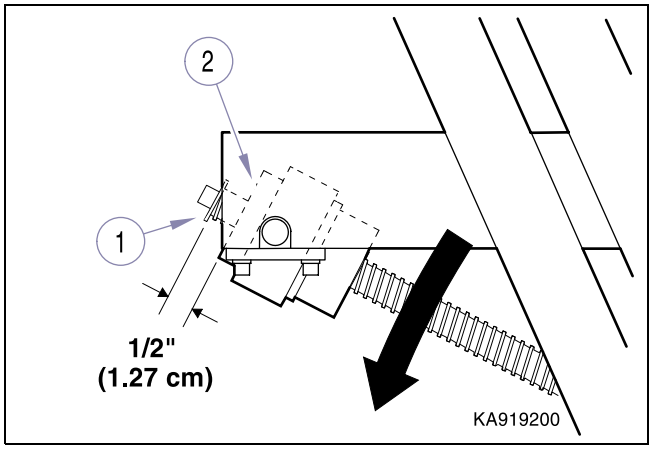

Figure 4-30. Base Up / Down Limit Switches

c. Lower Base Down function until flat washer (1, Figure 4-30) is 1/2” (1.27 cm) from face of trunnion nut (2).

NOTE
Rotate Base Up limit switch cam (2, Figure 4-29) **above** switch trip button (A) and then **downward** to trip button during adjustment due to rotational direction of cam (2).

d. Rotating in **downward** direction, adjust cam (2, Figure 4-29) so that it *“just”* operates trip button (A) of Base Up limit switch (3); then tighten screw (1) on cam.

(5) Base Down Limit Switch Adjustment.

a. Loosen screw (4, Figure 4-29) and rotate cam (5) ***down*** off trip button (B) of Base Down limit switch (6).

CAUTION
Do not run Base Down function any lower than specified in step 7. Doing so could allow chair to physically collide with itself, damaging motor, covers, or other components.

(6) Lower Base Down function until measurement (A, Figure 4-31) between surface of baseplate and top of cross weldment is *no lower than 8 5/8 in. (21.9 cm) or higher than 8 3/4 in. (22.2 cm)*

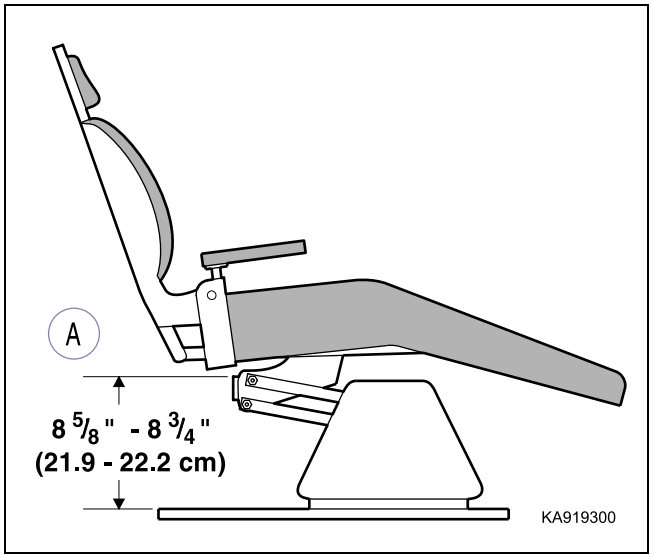

Figure 4-31. Base Up / Down Limit Switches

NOTE
Rotate Base Down limit switch cam (5, Figure 4-29) **below** switch trip button (B) and then **upward** to trip button during adjustment due to rotational direction of cam (5).

(7) Rotating in **upward** direction, adjust cam (5, Figure 4-29) so that it "just" operates trip button (B) of Base Down limit switch (6); then tighten screw (4) on cam.

(8) Plug chair power cord into wall outlet and check operation.

(9) Install bottom lift arm cover (4, Figure 4-28), L.H. (1) and R.H. (3) and center (2) platform covers (four screws).

(10) Install R.H. (2, Figure 4-27) base cover (three screws).

4.11 Base Up Program Limit Switch

A. Removal

(1) Remove R.H. base cover (1,Figure 4-32) (three screws).

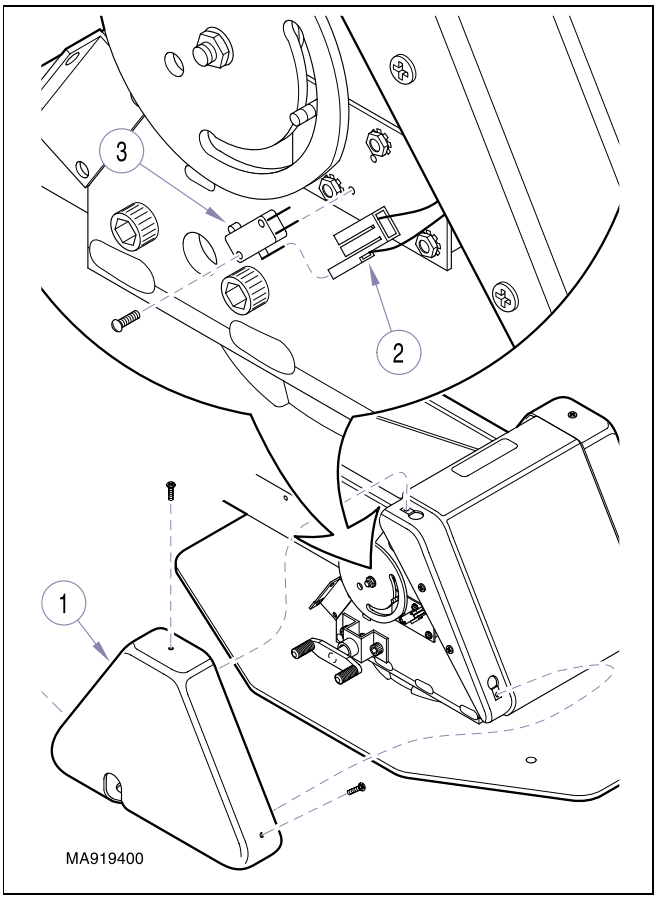

Figure 4-32. Base Up Program Limit Switch

(2) Disconnect wire harness (2).

(3) Remove base up program limit switch (3) (two screws).

B. Installation

(1) Install base up program limit switch (3, Figure 4-32) (two screws).

(2) Connect wire harness (2).

(3) Install R.H. base cover (1) (three screws) and check operation.

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4.12 Back Up Limit Switch

A. Removal

(1) Remove seat upholstery (refer to para 4-2).

(2) Raise Base Up all way up and lower Back Down function all way down.

(3) Unplug chair power cord.

(4) Disconnect switch harness (1, Figure 4-33) from back up limit switch (2).

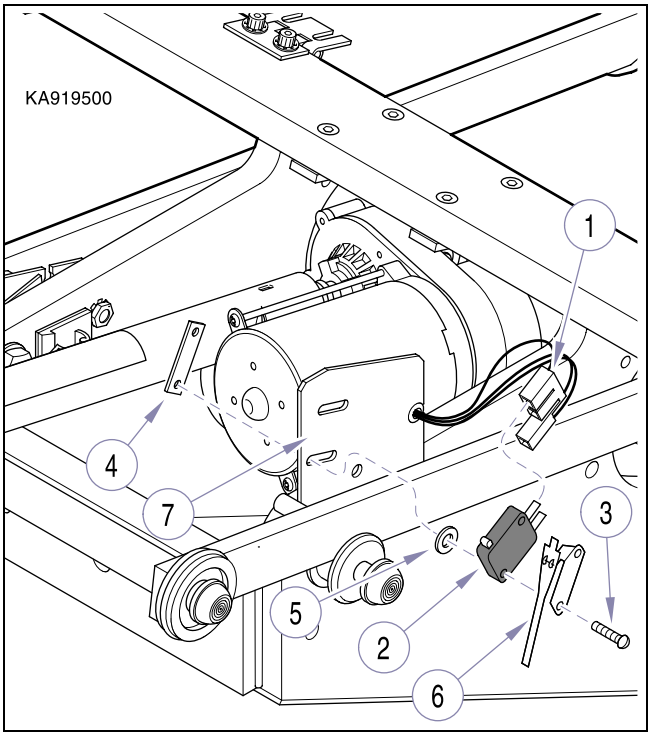

Figure 4-33. Back Up Limit Switch

(5) Remove two screws (3), nut bar (4), back up limit switch (2), washers (5), and actuator (6) from limit switch plate (7).

B. Installation

(1) Assemble two screws (3, Figure 4-33), actuator (6), and two washers (5) on Back Up limit switch (2).

(2) Install back up limit switch assembly (2) on limit switch plate (7) positioning it as far toward foot end as possible and secure with nut bar (4).

(3) Connect switch harness (1) to back up limit switch (2).

C. Adjustment

EQUIPMENT ALERT
Be sure that Back Up Limit Switch trips to the "open" position *before* internal limit switch in Back Motor trips.

(1) Raise Back Up function all way up (until *Back Up limit switch* is tripped).

NOTE
If necessary, disconnect switch harness and use an ohmmeter to determine if normally closed (C / NC) contacts have opened and reinstall switch harness.

EQUIPMENT ALERT
Seat support bar assembly (1, Figure 4-34) and top cross brace (A) of seat platform (2) should not come in contact when back is all way up.

(2) Distance between seat support bar assembly (1, Figure 4-34) and top cross brace (A) of seat platform (2) should be approximately 1/8" (.32 cm).

(3) If necessary, loosen two screws (3, Figure 4-33) and adjust back up limit switch (2) to trip earlier or later.

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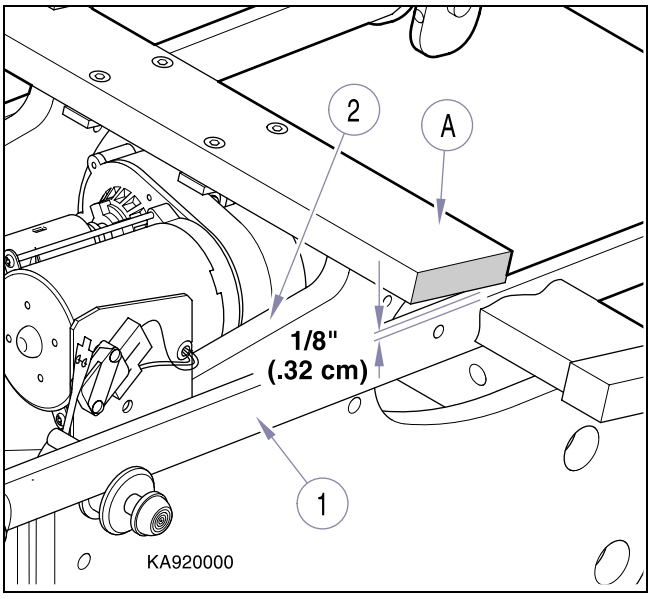

Figure 4-34. Back Up Limit Switch

4.13 Back Down Program Limit Switch

A. Removal

(1) Raise Base Up all way up and lower Back Down function all way down.

(2) Unplug chair from wall outlet.

(3) Remove seat upholstery (refer to para 4-2).

(4) Lift upward on seat support assembly (1, Figure 4-35) and place a support beneath it to hold it in place while working on Back Down Program Limit Switch (2).

(5) Disconnect wire harness (3) from back down program limit switch (2).

(6) Remove two screws (4), limit switch (2), and nut bar (5) from limit switch bracket (6).

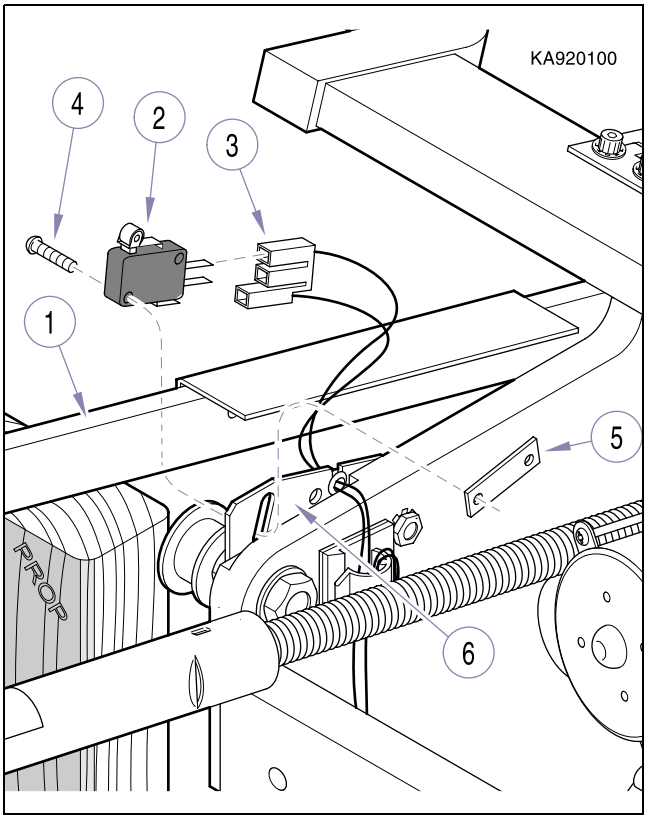

Figure 4-35. Back Down Program Limit Switch

B. Installation

(1) Install limit switch (2, Figure 4-35) on limit switch bracket (6) and secure with two screws (4) and nut bar (5).

(2) Connect wire harness (3).

C. Adjustment

EQUIPMENT ALERT
Assure trip arm (A, Figure 4-36) does *not bottom out* on back down program limit switch (1) body when it comes in contact with back down programming plate (2).

(1) Run Auto Operate function and observe. If trip arm (A, Figure 4-36) bottoms out or does not trip when it comes into contact with programming plate (2), back down program limit switch (1) needs adjusted.

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(2) Loosen two mounting screws (3) and adjust back down program limit switch (1) up or down as necessary. Tighten two mounting screws (3).

(3) Check operation.

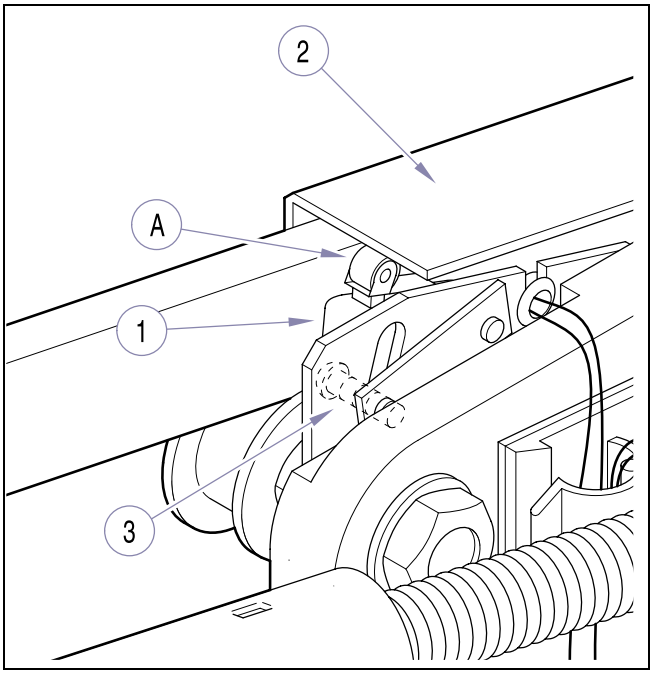

Figure 4-36. Back Down Program Limit Switch

4.14 Safety Bail Limit Switches

A. Removal

(1) Raise chair BASE UP function all way up.

(2) Unplug chair power cord from wall outlet.

(3) Remove R.H. (1, Figure 4-37) and L.H. (2) base covers (three screws each).

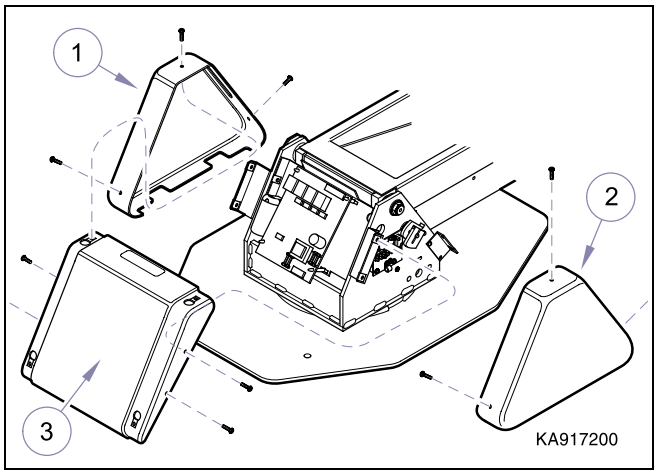

Figure 4-37. Safety Bail Limit Switches

(4) Remove center base cover (3) (four screws).

(5) Remove L.H. (1, Figure 4-38), Center (2) and R.H. (3) platform covers (4 screws).

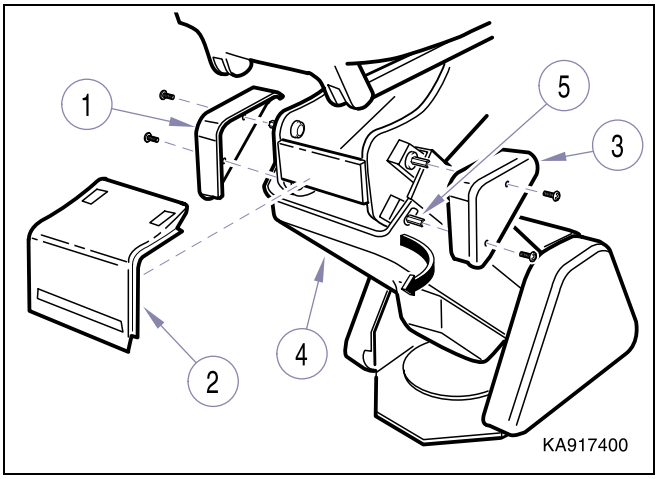

Figure 4-38. Safety Bail Limit Switches

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(6) Pull outward on one corner of bottom lift arm cover (4) until it clears standoff (5). Repeat step for other corner and remove cover (4).

(7) Disconnect wire harness (1, Figure 4-39) from malfunctioning Safety Bail limit switch (2).

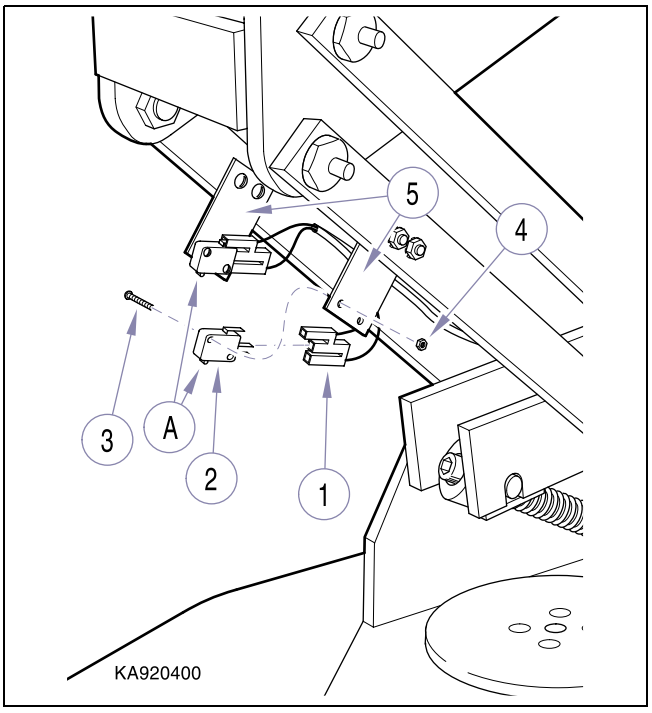

Figure 4-39. Safety Bail Limit Switches

(8) Remove two mounting screws (3) and nuts (4) and remove limit switch (2).

B. Installation

(1) Place limit switch (2, Figure 4-39) in position on mounting bracket (5) and secure with two mounting screws (3) and nuts (4).

(2) Attach wire harness (1).

WARNING
Actuator (A) on Safety Bail Limit Switches (2) are operated when inside surface of bottom lift arm cover comes in contact with them. Position switch mounting brackets (5) so actuators (A) contact cover. Failure to comply could result in switches not operating and personal injury.

(3) Loosen two mounting screws for limit switch bracket (5), then push bottom of bracket (5) toward foot end of chair as far as possible and retighten screws.

(4) Install bottom lift arm cover (4, Figure 4-38), center (2), R.H. (3), and L.H. (1) platform covers (four screws).

(5) Install center base cover (1, Figure 4-37) (four screws)

(6) Install R.H. (1) and L.H. (2) base covers (six screws).

(7) Plug in chair and check operation. Press upward on the center platform cover (4, Figure 4-38) as chair is descending. Chair should stop descending.

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4.15 Membrane Switch Panel (Biltmore Classic only)

A. Removal

(1) Unplug chair power cord.

(2) Remove back upholstery (refer to para 4.2).

(3) Disconnect wire harness (1, Figure 4-40) from membrane switch panel (2).

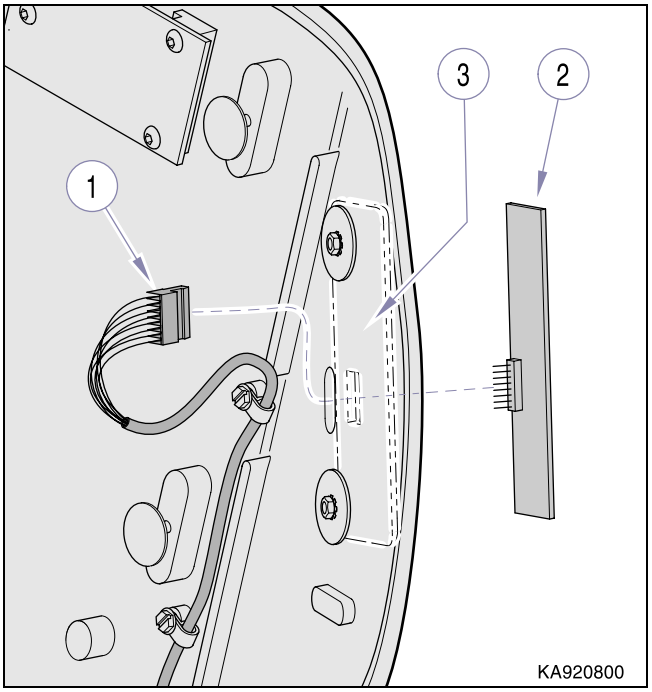

Figure 4-40. Membrane Switch Panel

(4) Peel membrane switch (2) off bezel (3).

B. Installation

(1) After removing protective backing from membrane switch, place switch in position on bezel (3, Figure 4-40) and press firmly to adhere switch to bezel.

(2) Connect wire harness (1) to membrane switch panel (2).

(3) Install back upholstery.

(4) Plug chair power cord into outlet and check operation.

4.16 Manual Footswitch

A. Removal

(1) Unplug chair power cord.

(2) Remove five screws (1, Figure 4-41), base plate (2), and insulation (3) from footswitch housing (4).

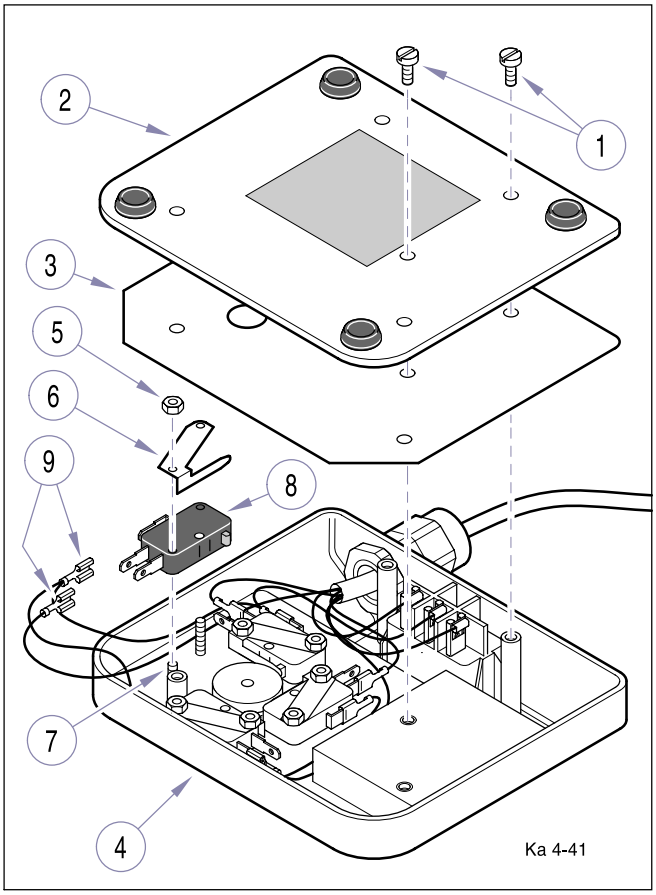

Figure 4-41. Manual Footswitch

(3) Remove two nuts (5) and actuator (6) from two studs (7).

(4) Remove footswitch (8); then tag and disconnect wires (9) from footswitch (8).

B. Installation

(1) Connect wires (9, Figure 4-41) to terminals of footswitch (8).

(2) Install footswitch (8) and actuator (6) on studs (7) and secure with two nuts (5).

(3) Install insulation (3) and base plate (2) on footswitch housing (4) and secure with five screws (1).

(4) Plug in chair power cord.

4.17 Auto Exit / Operate Footswitch

A. Removal

(1) Unplug chair power cord.

(2) Remove five screws (1, Figure 4-42), base plate (2), and insulation (3) from footswitch housing (4).

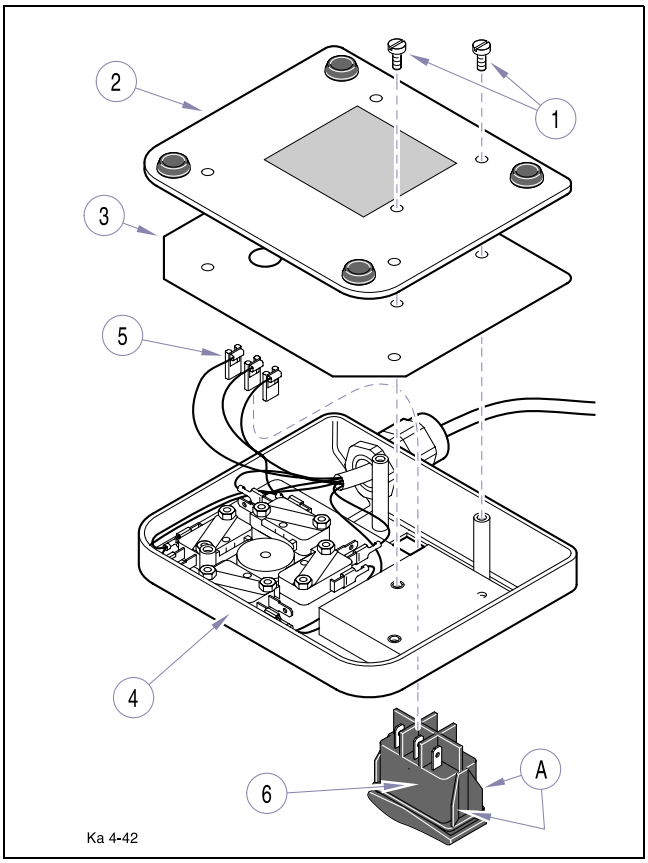

Figure 4-42. Auto Exit / Operate Footswitch

(3) Tag and disconnect wires (5) footswitch (6).

(4) While simultaneously pushing in on four locking tabs (A) of footswitch (6), push footswitch out of footswitch housing (4).

B. Installation

EQUIPMENT ALERT
Make sure footswitch is installed in same orientation as shown in illustration. Failure to do so will result in incorrect actions when the Auto Operate (Green) or Auto Exit (Yellow) functions are selected.

(1) Push footswitch (6, Figure 4-42) into footswitch housing (4) until it snaps into place and is fully seated.

(2) Connect wires (5) to terminals of footswitch (6).

(3) Install insulation (3) and base plate (2) on footswitch housing (4) and secure with five screws (1).

(4) Plug in chair power cord.

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4.18 Rotational Brake (Biltmore Classic only)

A. Removal

(1) Raise Base Up function all way up.

(2) Unplug chair power cord.

(3) Remove R.H. base cover (1, Figure 4-43) (three screws).

(4) Place Brake lever (2) in *Unlocked* position.

(5) Remove disc lock (3), four screws.

(6) Remove brake block assembly (4).

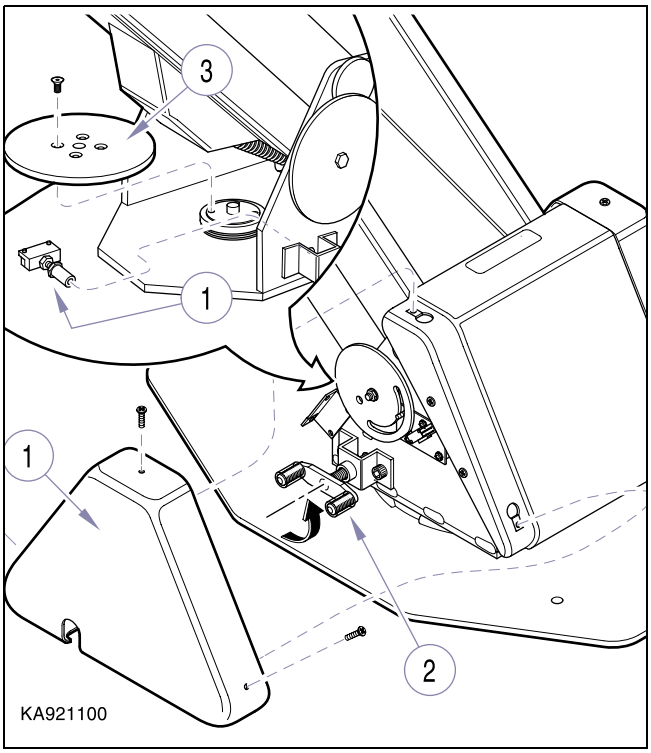

Figure 4-43. Rotational Brake

(7) Unscrew brake block (1,Figure 4-43) from lock stud (2).

(8) Remove two set screws (3) from brake block (1).

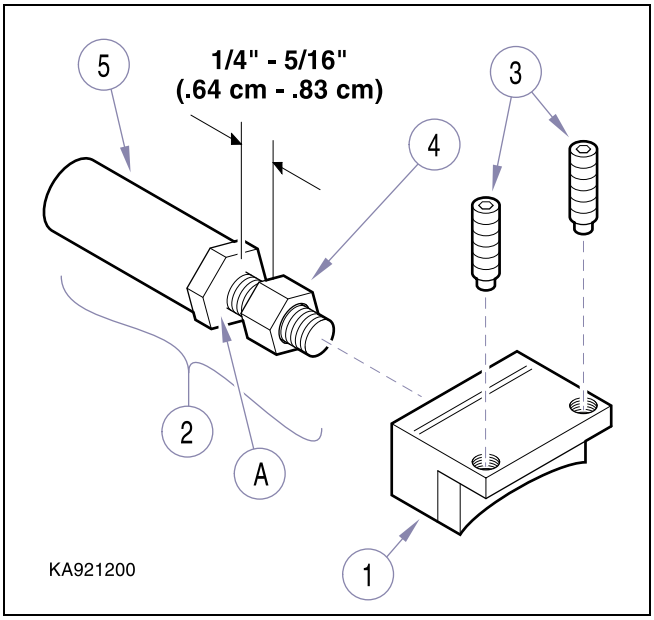

Figure 4-44. Rotational Brake

B. Installation

NOTE
Inspect nylon tipped set screws (3, Figure 4-44). If worn or damaged replace screws.

(1) Install two set screws (3, Figure 4-44)) in brake block (1).

NOTE
When assembling brake block (1, Figure 4-44), position jam nut (4) on lock stud (5) so there is approximately 1/4" to 5/16" distance between jam nut (4) and face of hex (A) on lock stud (5).

(2) Assemble brake block (1, Figure 4-44) and lock stud (5).

(3) Insert brake block assembly (1, Figure 4-45) into hole of upright housing assembly (2).

(4) Install disc lock (3) and secure with four screws.

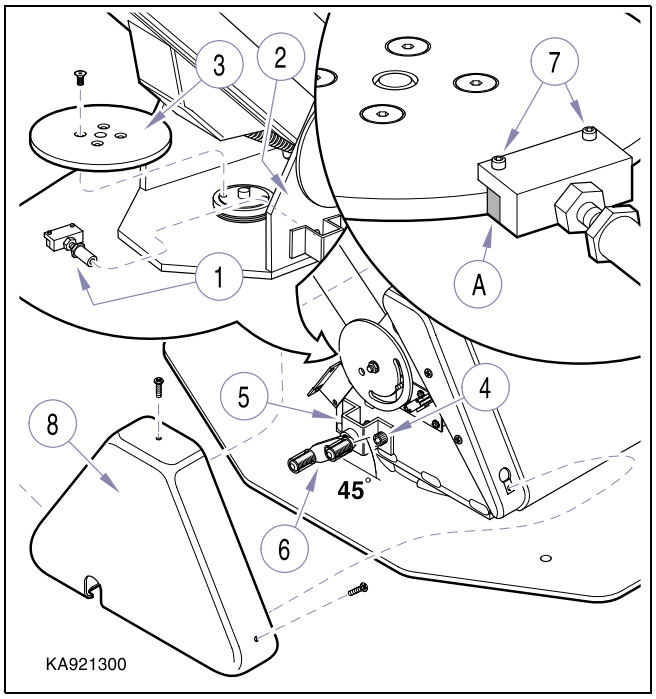

Figure 4-45. Rotational Brake

C. Adjustment

(1) Loosen two screws (4, Figure 4-45) that secure rotational lock bracket (5) to upright housing assembly (2).

(2) Position brake lever (6) so that it is at a 45° angle as shown in illustration.

NOTE
Make sure brake shoe (A) is seated correctly against disc lock (5). Nylon tipped set screws (7) must be adjusted to hold brake block (1) in a level position to prevent uneven wear on brake shoe (A) For adjustment to work correctly, brake lever must continue to be pushed on firmly while screws are being tightened.

(3) While pulling upward on brake lever (6), push inward to force brake shoe (A) and set screws (7) firmly against brake disc (6); then tighten screws (4).

(4) Position brake lever in *Brake* position and check adjustments.

(5) Install R.H. base cover (4, Figure 4-44).

4.19 Headrest

A. Adjustment

(1) Raise Back Up function all way up.

(2) Remove back upholstery (refer to para 4.2).

(3) Loosen two jam nuts (1, Figure 4-46).

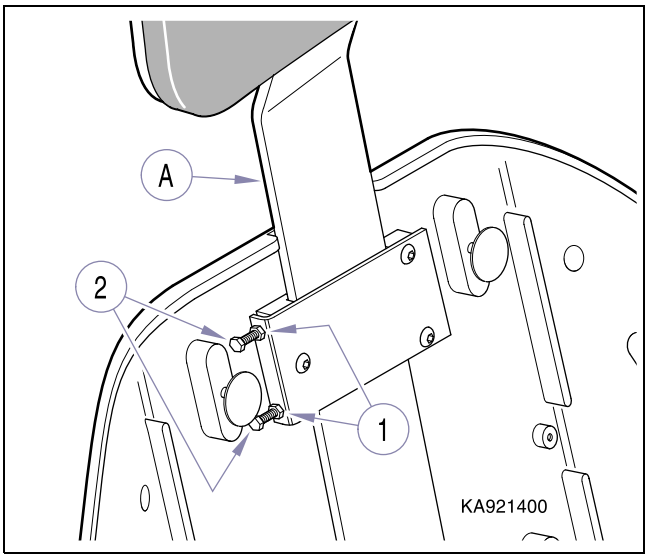

Figure 4-46. Headrest

EQUIPMENT ALERT
Tighten or loosen two adjustment screws (2) evenly to allow for full and even surface contact of friction tangs. Failure to do so could result in uneven friction braking.

(4) If headrest assembly (A) slides down by itself or moves too easily, tighten two adjustment screws (2).

If headrest assembly (A) requires excessive force to position, loosen two adjustment screws (2).

(5) Test friction setting by sliding headrest assembly (A) in and out. Repeat step (4) until desired friction setting is achieved.

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(6) While holding adjustment screws (2) with a wrench, tighten jam nuts (1).

(7) Install back upholstery.

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SECTION V
SCHEMATICS AND DIAGRAMS

5.1 Electrical Schematics / Wiring Diagrams

Figure 5-1 illustrates the wiring connections between the components in the 120 VAC chair. Figures 5-2 and 5-3 illustrate the main PC board plug connectors and related circuitry. Figure 5-4 thru 5-6 show the main PC board,TB1 terminal board, and related components.

J2 Pin Out for Membrane Switch

Pin	Color	Function
1	Black	12 Volt DC
2	Blue	Auto Exit
3	Brown	Auto Operate
4	Green	Back Up
5	Orange	Back Down
6	Red	Base Up
7	White	Base Down
8	Yellow	Light Switch

J3 Pin Out for Foot Switch

Pin	Color	Function
1	Brown	12 Volt DC
2	Blue	Auto Exit
3	Orange	Auto Operate
4	Green	Back Up
5	Black	Back Down
6	Red	Base Up
7	White	Base Down
8	-	Open

J4 Pin Out for Program, Operation and Limit Switches

Pin	Color	Function
1	Red	800 to 860 Ohms to Ground
2	Black	800 to 860 Ohms to Ground Base Up Program Operation Switch Closed
3	Brown	800 to 860 Ohms to Ground
4	Green	800 to 860 Ohms to Ground Back Down Program Operation Switch Closed
5	White	12 VDC from Back Up Limit Switch
6	Red	12 VDC out to Back Up Limit Switch
7	Black	Return 12 VDC from Back Up Limit Switch
8	Green	Return 12 VDC from Base Down Limit Switch
9	Red	12 VDC out to Base Up and Base Down Limit Switches
10	Black	Return 12 VDC from Base Up Limit Switch

J1

Pin	Color
1	White
2	Black
3	White
4	Black
5	Green/ Yellow

J5

Pin	Color
1	Red
2	White
3	Black
4	White
5	Blue
6	Green
7	Black
8	Black

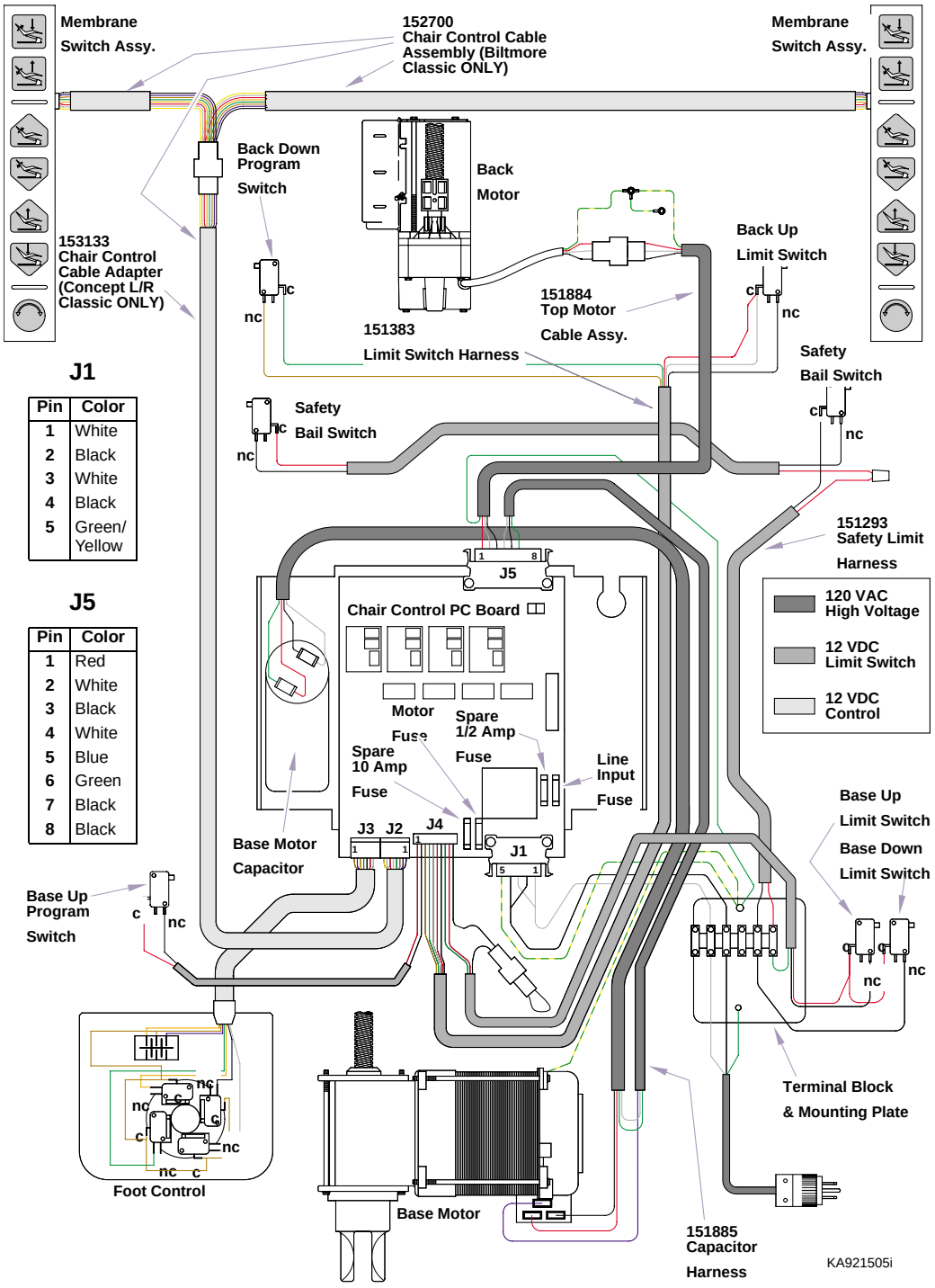

Figure 5-1. Wiring Diagram Biltmore Classic / Concept L/R Classic Dental Chair (120 VAC Units)

SECTION V
SCHEMATICS AND DIAGRAMS

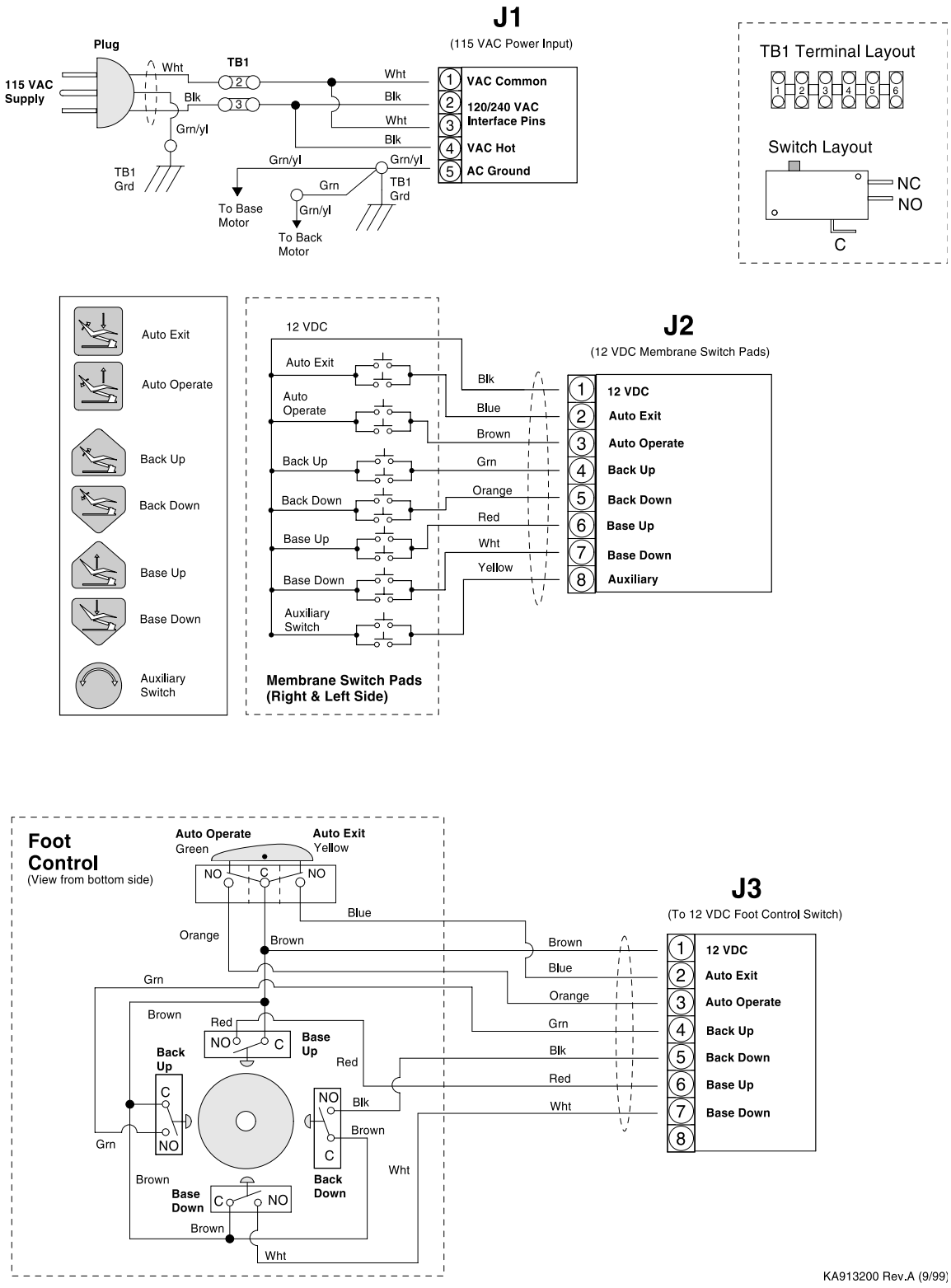

Figure 5-2. Main P.C. Board Plug Connectors (J1, J2, J3)
Biltmore Classic Dental Chair (120 VAC)

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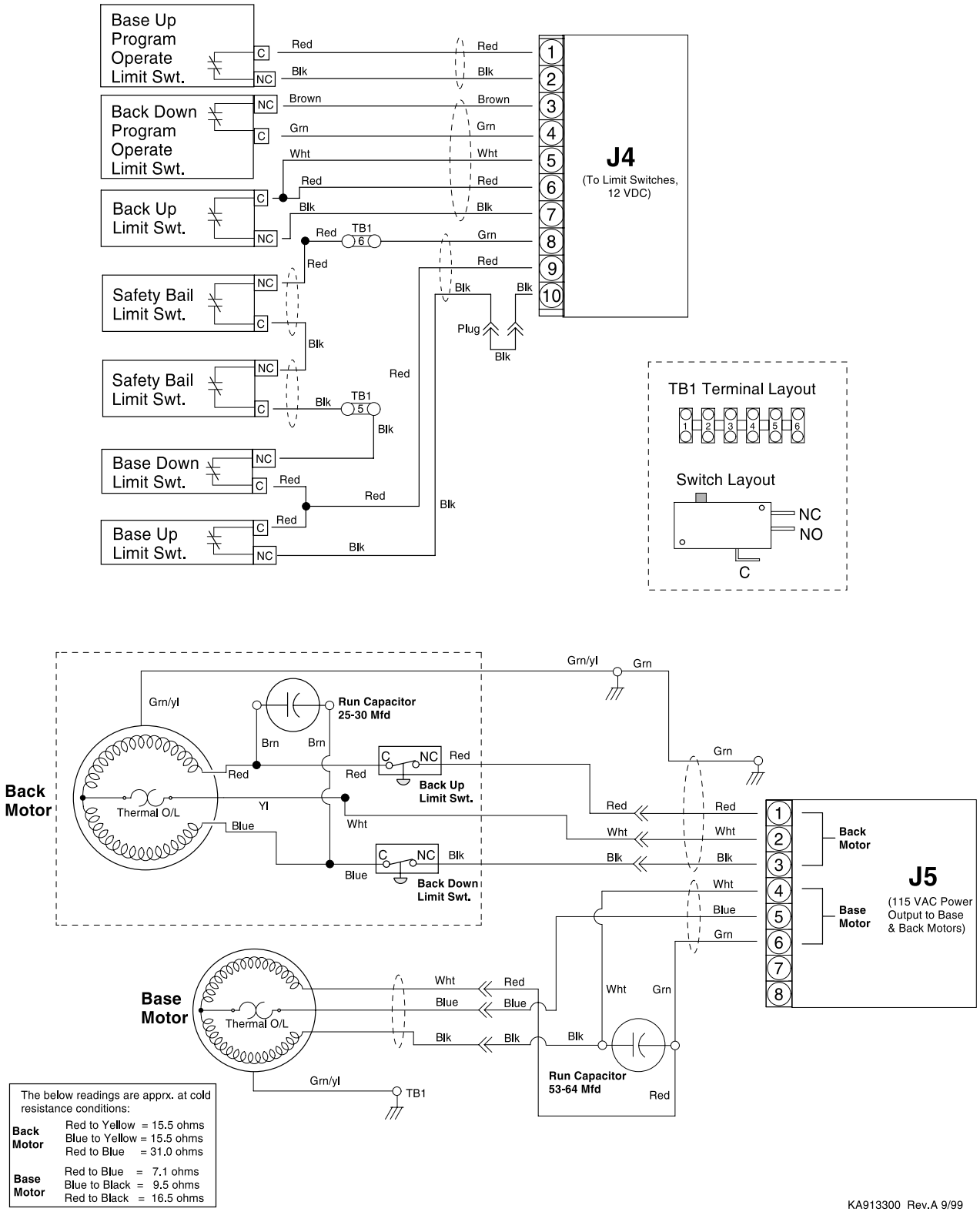


Figure 5-3. Main P.C. Plug Connectors (J4, J5)
Biltmore Classic Dental Chair (120 VAC)

SECTION V
SCHEMATICS AND DIAGRAMS

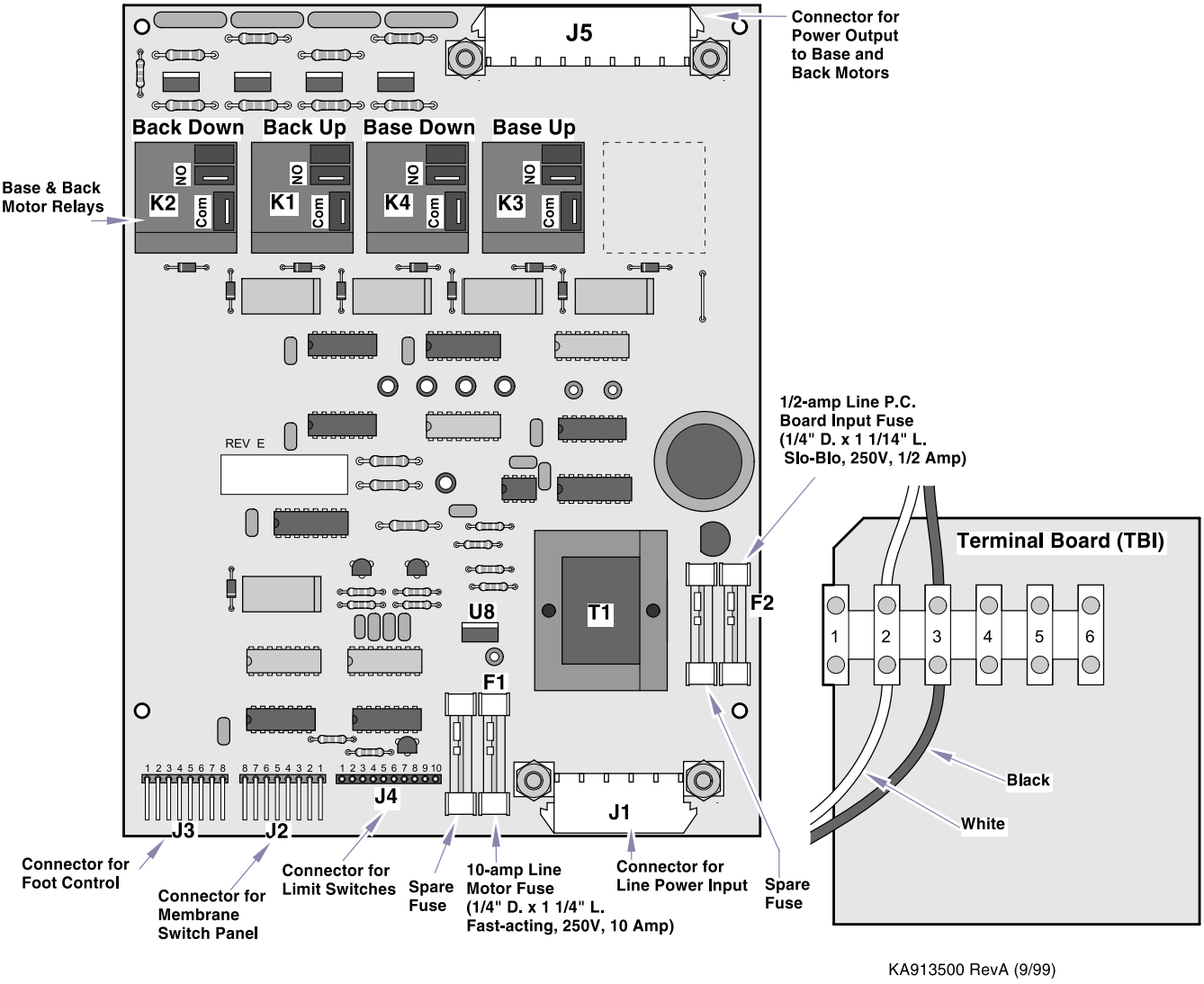
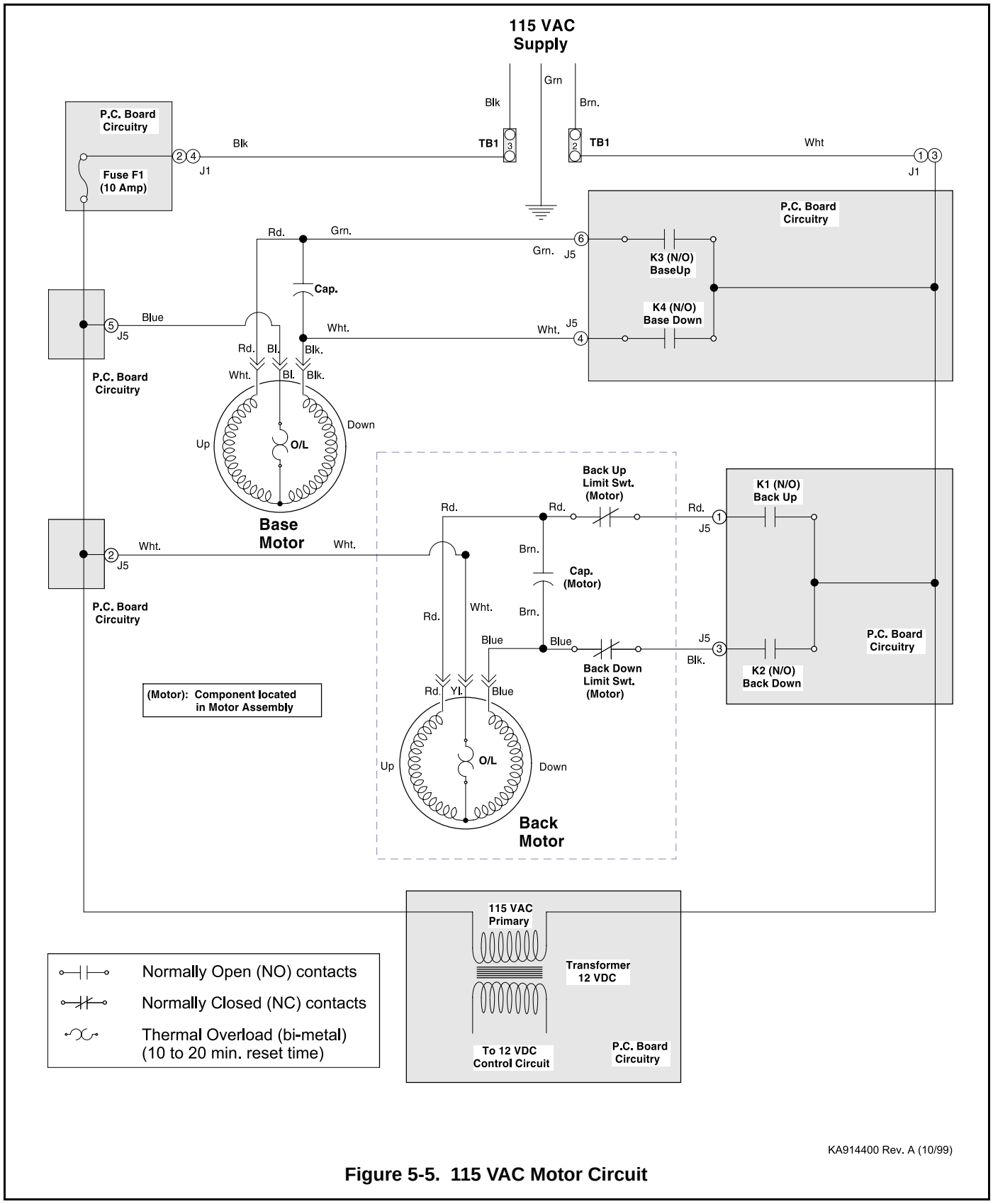


Figure 5-4. Main P.C. Board Component and Plug Layout
Biltmore Classic Dental Chair (120 VAC)



KA914400 Rev. A (10/99)

Figure 5-5. 115 VAC Motor Circuit

SECTION V
SCHEMATICS AND DIAGRAMS

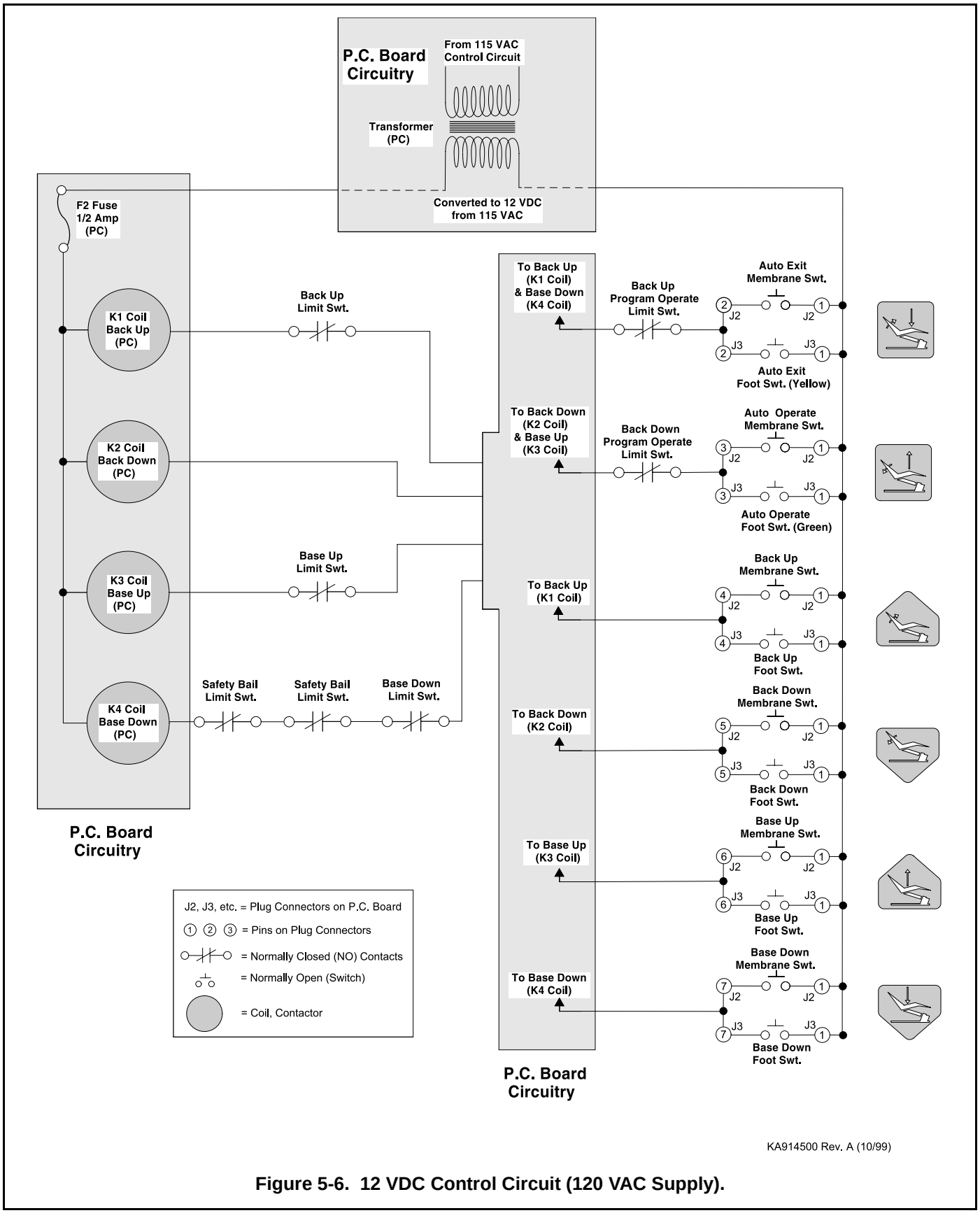

P.C. Board Circuitry
From 115 VAC Control Circuit
Transformer (PC)
Converted to 12 VDC from 115 VAC
F2 Fuse 1/2 Amp (PC)
K1 Coil Back Up (PC)
K2 Coil Back Down (PC)
K3 Coil Base Up (PC)
K4 Coil Base Down (PC)
Back Up Limit Swt.
Base Up Limit Swt.
Safety Bail Limit Swt.
Safety Bail Limit Swt.
Base Down Limit Swt.
P.C. Board Circuitry
To Back Up (K1 Coil) & Base Down (K4 Coil)
To Back Down (K2 Coil) & Base Up (K3 Coil)
To Back Up (K1 Coil)
To Back Down (K2 Coil)
To Base Up (K3 Coil)
To Base Down (K4 Coil)
P.C. Board Circuitry
Back Up Program Operate Limit Swt.
Back Down Program Operate Limit Swt.
Auto Exit Membrane Swt.
Auto Exit Foot Swt. (Yellow)
Auto Operate Membrane Swt.
Auto Operate Foot Swt. (Green)
Back Up Membrane Swt.
Back Up Foot Swt.
Back Down Membrane Swt.
Back Down Foot Swt.
Base Up Membrane Swt.
Base Up Foot Swt.
Base Down Membrane Swt.
Base Down Foot Swt.
J2, J3, etc. = Plug Connectors on P.C. Board
1 2 3 = Pins on Plug Connectors
= Normally Closed (NO) Contacts
= Normally Open (Switch)
= Coil, Contactor
KA914500 Rev. A (10/99)

Figure 5-6. 12 VDC Control Circuit (120 VAC Supply).

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J2 Pin Out for Membrane Switch

Pin	Color	Function
1	Black	12 Volt DC
2	Blue	Auto Exit
3	Brown	Auto Operate
4	Green	Back Up
5	Orange	Back Down
6	Red	Base Up
7	White	Base Down
8	Yellow	Light Switch

J3 Pin Out for Foot Switch

Pin	Color	Function
1	Brown	12 Volt DC
2	Blue	Auto Exit
3	Orange	Auto Operate
4	Green	Back Up
5	Black	Back Down
6	Red	Base Up
7	White	Base Down
8	-	Open

J4 Pin Out for Program, Operation and Limit Switches

Pin	Color	Function
1	Red	800 to 860 Ohms to Ground
2	Black	800 to 860 Ohms to Ground Base Up Program Operation Switch Closed
3	Brown	800 to 860 Ohms to Ground
4	Green	800 to 860 Ohms to Ground Back Down Program Operation Switch Closed
5	White	12 VDC from Back Up Limit Switch
6	Red	12 VDC out to Back Up Limit Switch
7	Black	Return 12 VDC from Back Up Limit Switch
8	Green	Return 12 VDC from Base Down Limit Switch
9	Red	12 VDC out to Base Up and Base Down Limit Switches
10	Black	Return 12 VDC from Base Up Limit Switch

J1

Pin	Color
1	White
2	Black
3	White
4	Black
5	Green/ Yellow

J5

Pin	Color
1	Red
2	White
3	Black
4	White
5	Blue
6	Green
7	Black
8	Black

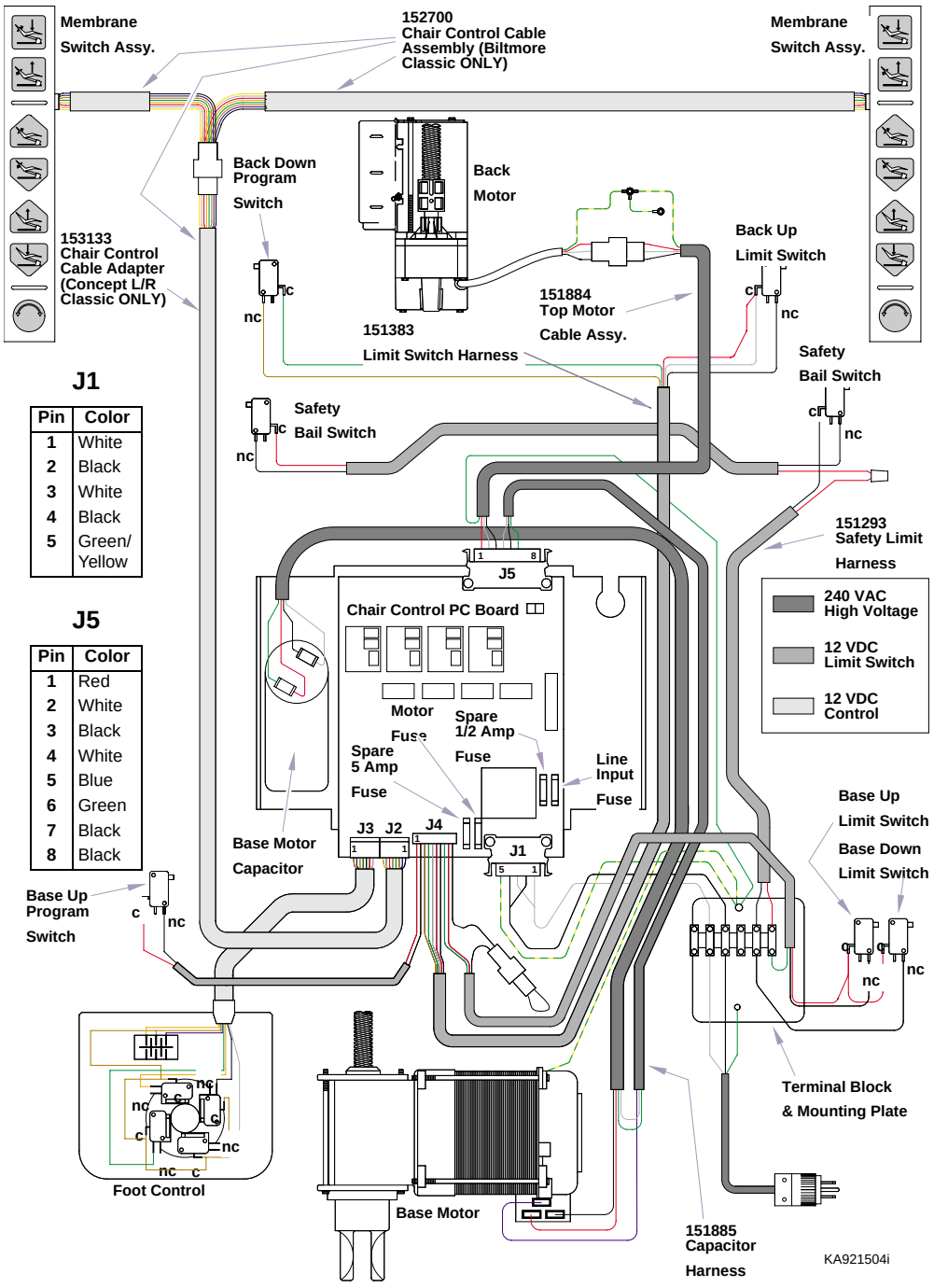

Figure 5-7. Wiring Diagram Biltmore Classic / Concept L/R Classic Dental Chair (240 VAC Units)

SECTION V
SCHEMATICS AND DIAGRAMS

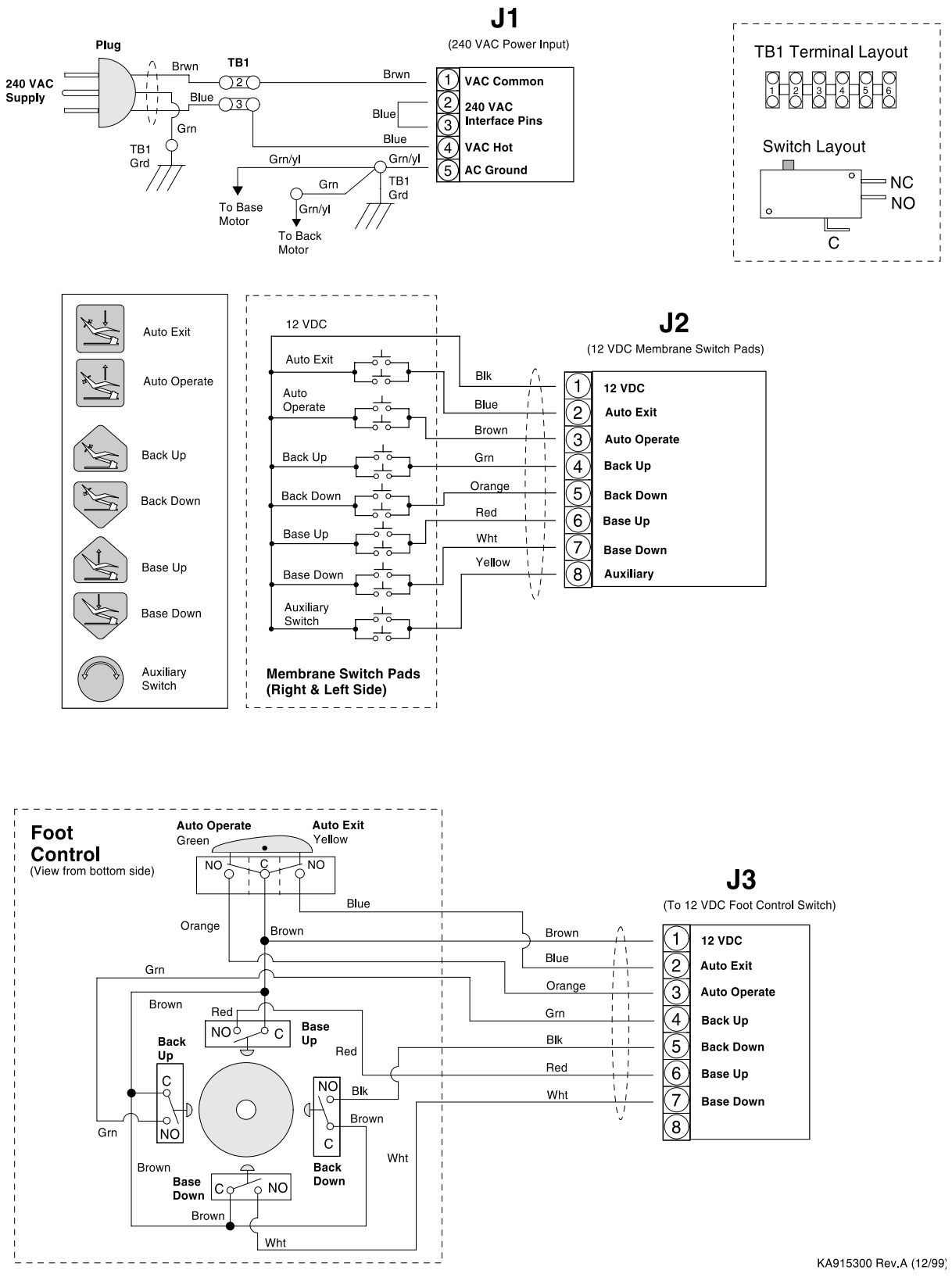

Figure 5-8. Main P.C. Board Plug Connectors (J1, J2, J3)
Biltmore Classic Dental Chair (240 VAC)

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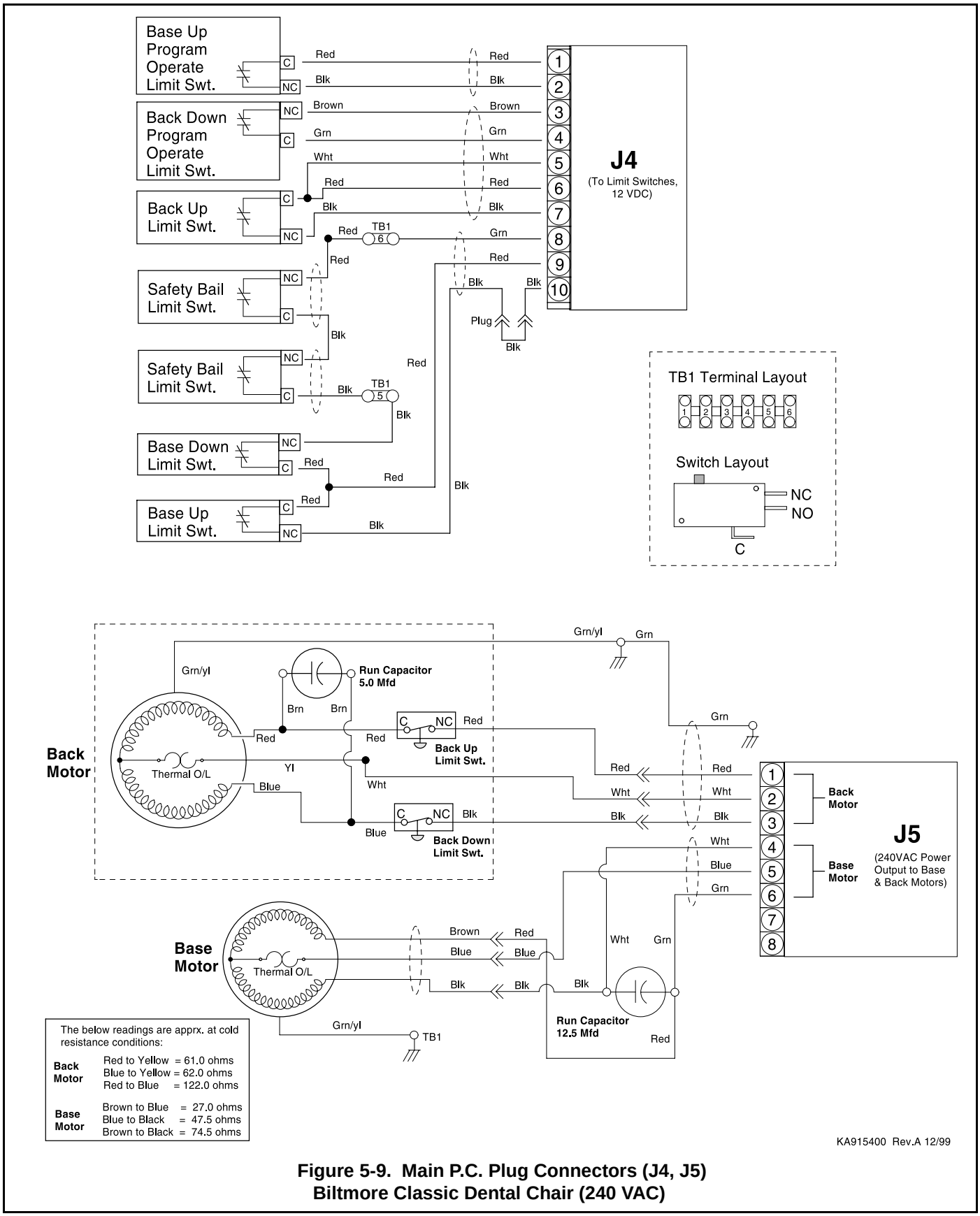

Figure 5-9. Main P.C. Plug Connectors (J4, J5)
Biltmore Classic Dental Chair (240 VAC)

SECTION V
SCHEMATICS AND DIAGRAMS

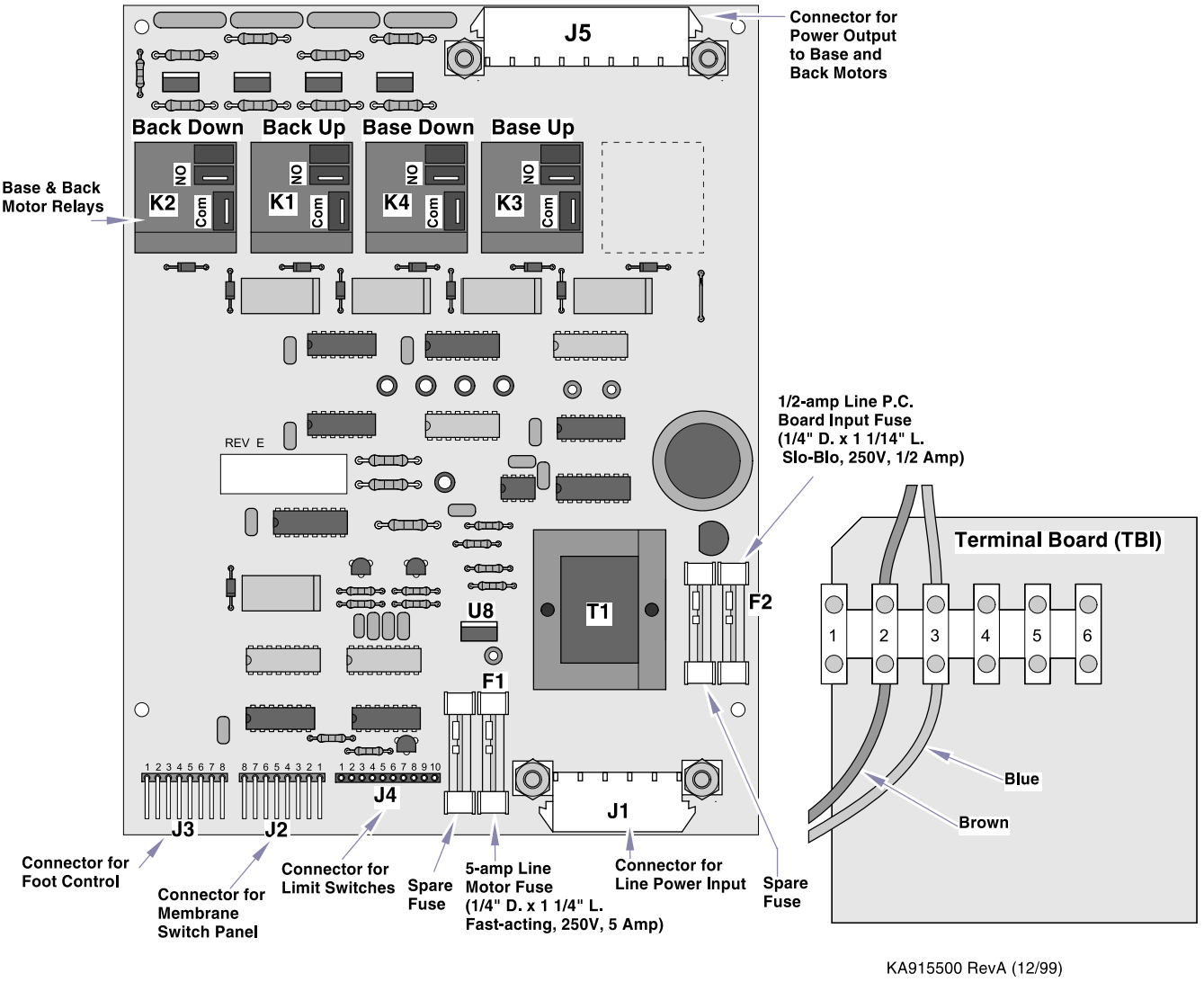

Figure 5-10. Main P.C. Board Component and Plug Layout
Biltmore Classic Dental Chair (240 VAC)

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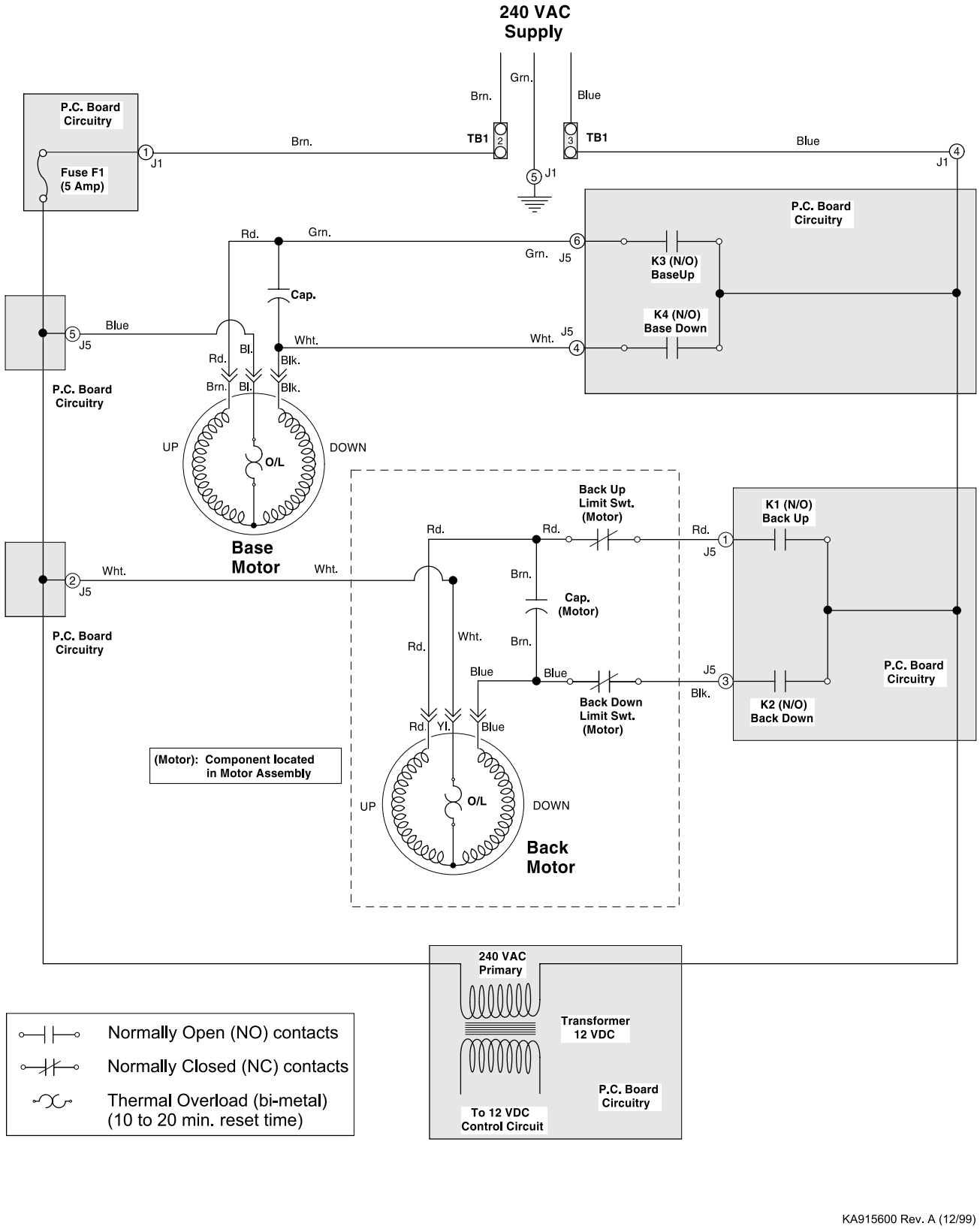

Figure 5-11. 240 VAC Motor Circuit

SECTION V
SCHEMATICS AND DIAGRAMS

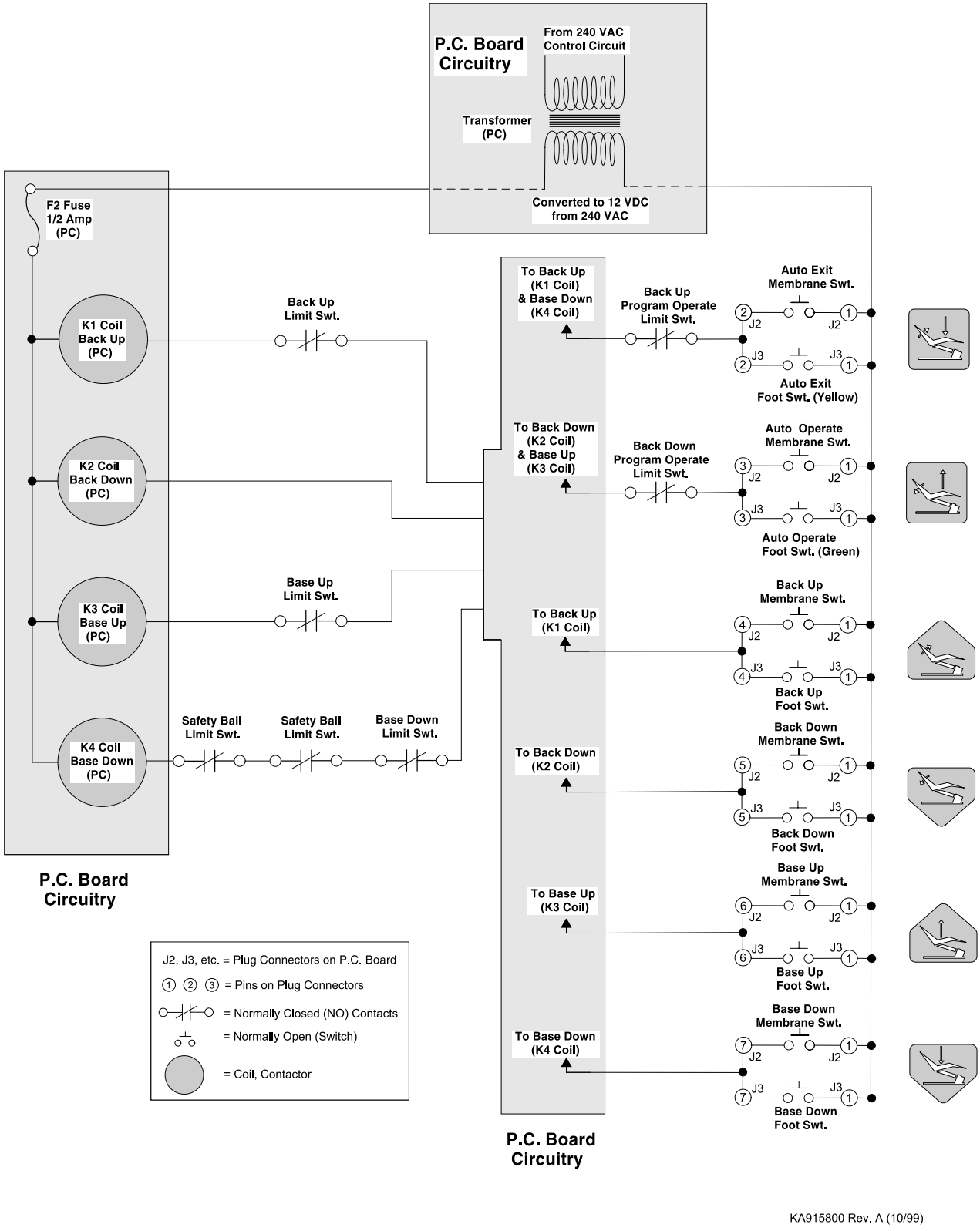
P.C. Board Circuitry
From 240 VAC Control Circuit
Transformer (PC)
Converted to 12 VDC from 240 VAC
F2 Fuse 1/2 Amp (PC)
K1 Coil Back Up (PC)
K2 Coil Back Down (PC)
K3 Coil Base Up (PC)
K4 Coil Base Down (PC)
Back Up Limit Swt.
Base Up Limit Swt.
Safety Bail Limit Swt.
Safety Bail Limit Swt.
Base Down Limit Swt.
P.C. Board Circuitry
To Back Up (K1 Coil) & Base Down (K4 Coil)
To Back Down (K2 Coil) & Base Up (K3 Coil)
To Back Up (K1 Coil)
To Back Down (K2 Coil)
To Base Up (K3 Coil)
To Base Down (K4 Coil)
P.C. Board Circuitry
Back Up Program Operate Limit Swt.
Back Down Program Operate Limit Swt.
Auto Exit Membrane Swt.
Auto Exit Foot Swt. (Yellow)
Auto Operate Membrane Swt.
Auto Operate Foot Swt. (Green)
Back Up Membrane Swt.
Back Up Foot Swt.
Back Down Membrane Swt.
Back Down Foot Swt.
Base Up Membrane Swt.
Base Up Foot Swt.
Base Down Membrane Swt.
Base Down Foot Swt.
J2
J3
J2, J3, etc. = Plug Connectors on P.C. Board
① ② ③ = Pins on Plug Connectors
= Normally Closed (NO) Contacts
= Normally Open (Switch)
= Coil, Contactor
KA915800 Rev. A (10/99)

Figure 5-12. 12 VDC Control Circuit. (240 VAC Supply)

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SECTION VI
PARTS LIST

6.1 Introduction

The illustrated parts list provides information for identifying and ordering the parts necessary to maintain the unit in peak operating condition. Refer to paragraph 1.5 for parts ordering information.

6.2 Description of Columns

The Item column of the parts list gives a component its own unique number. The same number is given to the component in the parts illustration. This allows a part number of a component to be found if the technician can visually spot the part on the illustration. The technician simply finds the component in question on the illustration and notes the item number of that component. Then, he finds that item number in the parts list. The row corresponding to the item number gives the technician the part number, a description of the component, and quantity of parts per subassembly. Also, if a part number is known, the location of that component can be determined by looking for the item number of the component on the illustration.

The Part No. column lists the MIDMARK part number for that component.

The Description column provides a physical description of the component.

The Qty. column lists the number of units of a particular component required for the subassembly. The letters “AR” denote “as required” when quantities of a particular component cannot be determined, such as: adhesive.

Bullets { • } in the Part No. column and the Description column show the indenture level of a component. If a component does not have a bullet, it is a main component of that illustration. If a component has a bullet, it is a subcomponent of the next component listed higher in the parts list than itself that does not have a bullet. Likewise, if a component has two bullets, it is a subcomponent of the next component listed higher in the parts list than itself that has only one bullet.

6.3 Torque Specifications and Important Assembly Notes

When specific assembly torque specifications, measurements, or procedures have been identified, by our engineering department, as required to assure proper function of the unit, those torque specifications measurements, and procedures will be noted on the parts illustrations. Adherence to these requirements is essential.

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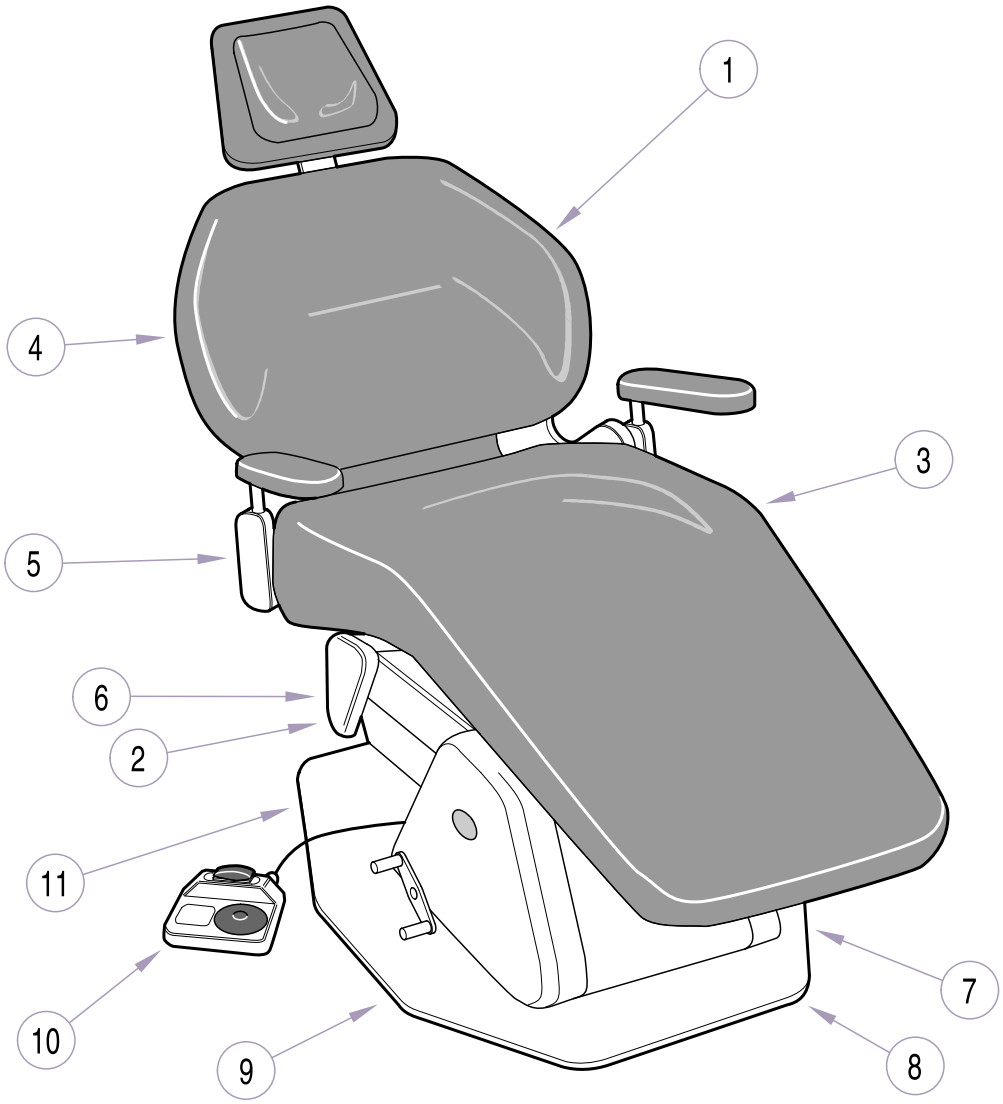
Pictorial Index



NOTE: This model uses Sterling Grey painted components.

KA916601

Used on units with Serial Number CP1000 thru Present

Item	Part No.	Description	Page
	152647	Biltmore Classic (120-volt w/ Rotation)	
	153102	Biltmore Classic Concept LR (120-volt)	
	152723	Biltmore Classic (240-volt w/ Rotation)	
	153039	Biltmore Classic (240-volt Non-Rotation)	
	153335	Biltmore Classic Concept LR (240-volt)	
1		• Upholstery Components (Vacuum Form)	6-4
		• Upholstery Components (Plush)	6-6
2		• Covers	6-8
3		• Seat Components	6-10
4		• Back Components	6-12
5		• Top Electrical Components	6-14
6		• Top Motor Assembly	6-16
7		• Base Components (Rotational)	6-17
		• Base Components (NonRotational)	6-19
8		• Base Electrical Components	6-21
9		• Base Motor Assembly	6-22
10		• Footswitch	6-23
11		• Umbilicals (LR Units)	6-25
		OPTIONAL ACCESSORIES	
12	153199	Single Articulating Headrest	6-29
13	152634***	Double Articulating Headrest	6-27
14	154043***	Pediatric Headrest w/ Pillow	n/a
15	154042***	Pediatric Headrest w/o Pillow	n/a
16	152509	Unit Mount	n/a
17	152284	Chair Mount Adapter w/18" Post	n/a
18	152538	48" Light Post w/ Mount	n/a
19	152565	IV Armboard	6-31

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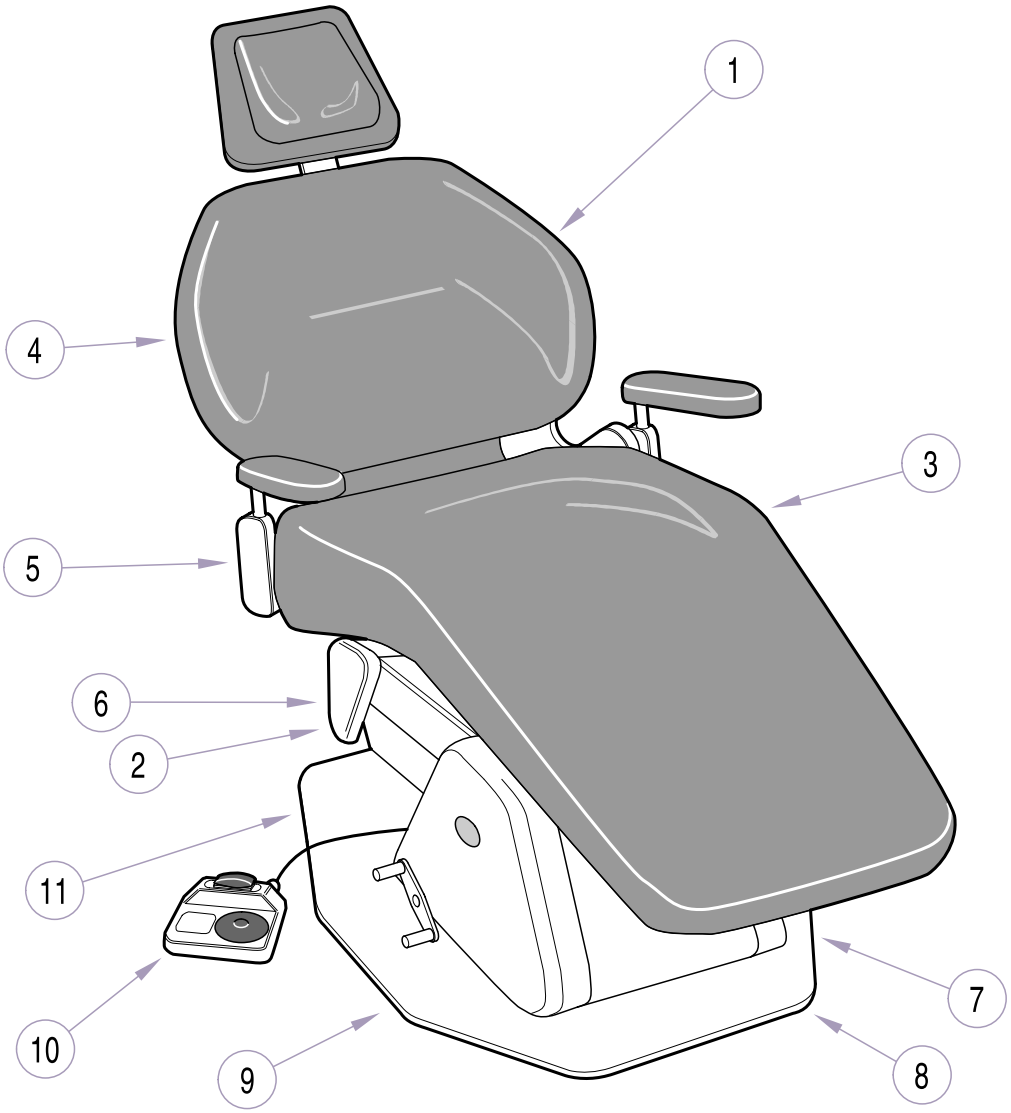
Pictorial Index



NOTE: This model uses Pebble Grey painted components.

KA916601

Used on units with Serial Number PB1000 thru Present

Item	Part No.	Description	Page
	152647-01	Biltmore Classic (120-volt w/ Rotation)	
	153102-01	Biltmore Classic Concept LR (120-volt)	
	152723-01	Biltmore Classic (240-volt w/ Rotation)	
	153039-01	Biltmore Classic (240-volt Non-Rotation)	
	153335-01	Biltmore Classic Concept LR (240-volt)	
1		• Upholstery Components (Vacuum Form)	6-5
		• Upholstery Components (Plush)	6-7
2		• Covers	6-9
3		• Seat Components	6-11
4		• Back Components	6-13
5		• Top Electrical Components	6-15
6		• Top Motor Assembly	6-16
7		• Base Components (Rotational)	6-18
		• Base Components (NonRotational)	6-20
8		• Base Electrical Components	6-21
9		• Base Motor Assembly	6-22
10		• Footswitch	6-24
11		• Umbilicals (LR Units)	6-26
		OPTIONAL ACCESSORIES	
12	154078-***	Single Articulating Headrest	6-30
13	154087-***	Double Articulating Headrest	6-28
14	154043***	Pediatric Headrest w/ Pillow	n/a
15	154042***	Pediatric Headrest w/o Pillow	n/a
16	152509-01	Unit Mount	n/a
17	152284-01	Chair Mount Adapter w/18" Post	n/a
18	152538-01	48" Light Post w/ Mount	n/a
19	154088-***	IV Armboard	6-32

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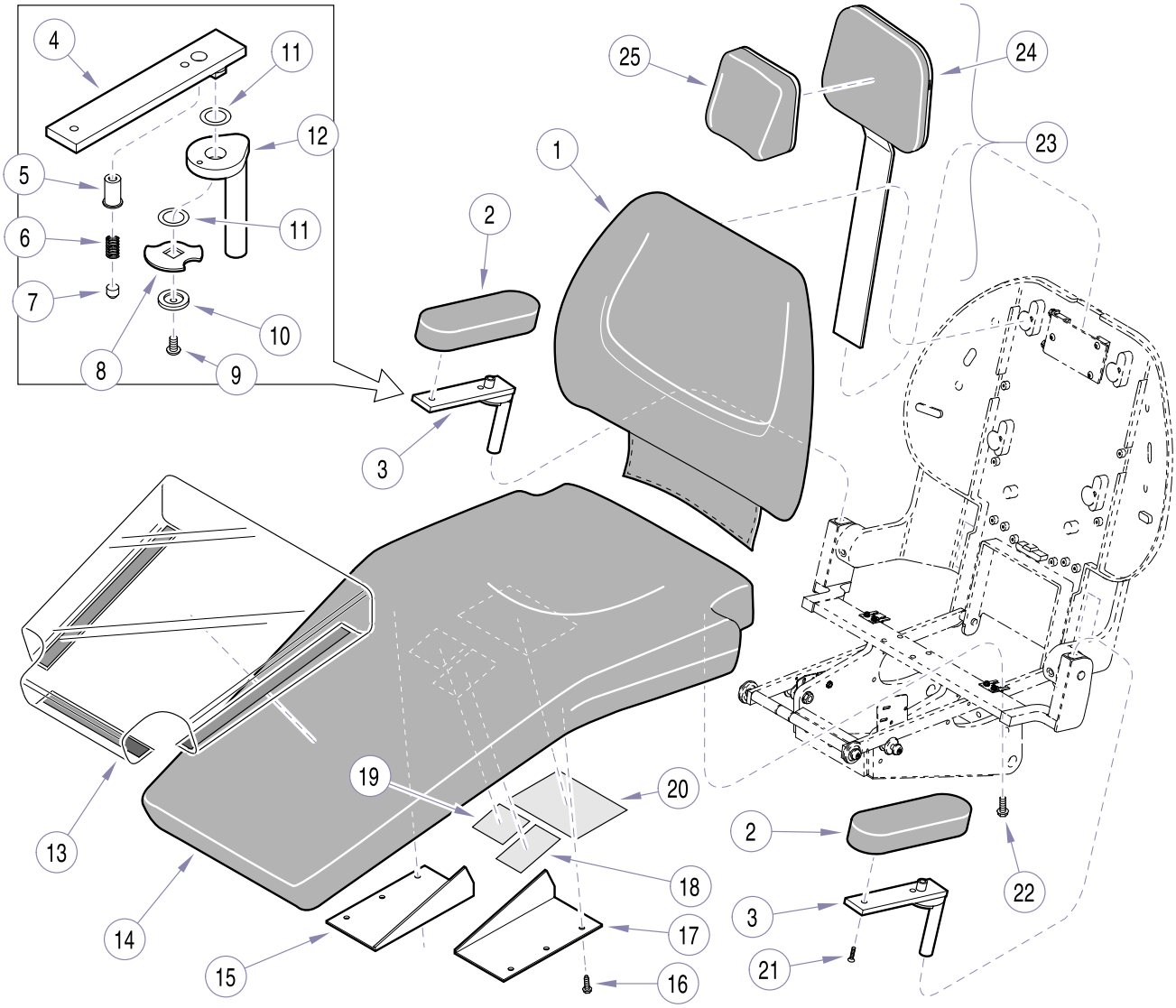
Upholstery Components (Vacuum Form)



NOTE: This model uses Sterling Grey painted components.

KA915700

Item	Part No.	Description	Qty
	154033xxx	Vacuum Form Upholstery Kit (Includes Items 1 thru 22)	1
1	• 152653xxx	• Back Rest Upholstery	1
2	• 152636xxx	• Arm Rest Cushion	2
3	• 152637	• RH Arm Rest Assy (Includes Items 4 thru 12) (Shown Exploded)	1
	• 152638	• LH Arm Rest Assy (Includes Items 4 thru 12)	1
4	• • 152675-1	• • Arm Rest Support (1 per Arm Rest)	2
5	• • 122006-2	• • Plunger Housing (1 per Arm Rest)	2
6	• • 121997	• • Spring (1 per Arm Rest)	2
7	• • 121996-3	• • Plunger (1 per Arm Rest)	2
8	• • 122007-1	• • Stop Plate (1 per Arm Rest)	2
9	• • 120950	• • Screw (1 per Arm Rest)	2
10	• • 121954-1	• • Retainer Disk (1 per Arm Rest)	2
11	• • 119034	• • Thrust Race (2 per Arm Rest)	4
12	• • 152674-1	• • Support Hub (1 per Arm Rest)	2
13	• 152898	• Foot Rest Cover (velcro- shown)	1
	148503	Foot Rest Cover (elastic- not shown)	1
14	• 152654xxx	• Seat Rest Assy (Includes Items 15 thru 20)	1
15	• • 121919-1	• • RH Roller Bracket	1
16	• •121077	• • Screw	6
17	• • 121920-1	• • LH Roller Bracket	1
18	• • 061-0041-00	• • Law Label	1
19	• • 300067	• • CA Compliance Label	1
20	• • 300116	• • Caution Label	1
21	• 118796	• Screw	4
22	• 120718	• Screw	4
23	154029xxx	Head Rest (Includes Items 24 and 25)	1
24	• 152456xxx	• Back Board	1
25	• 152457xxx	• Magnetic Pillow	1

Upholstery Color Suffixes (replaces the [xxx] where found)

Ash	VAS	Purple Grey	VPG
Cobalt	VCO	Sage	VSA
Slate Grey	VDG	Desert Rose	VDR
Taupe	VTP	Dusty Jade	VDJ
Wedgewood	VWW	Mauve	VMV
(Stitched Upholstery)	XX		

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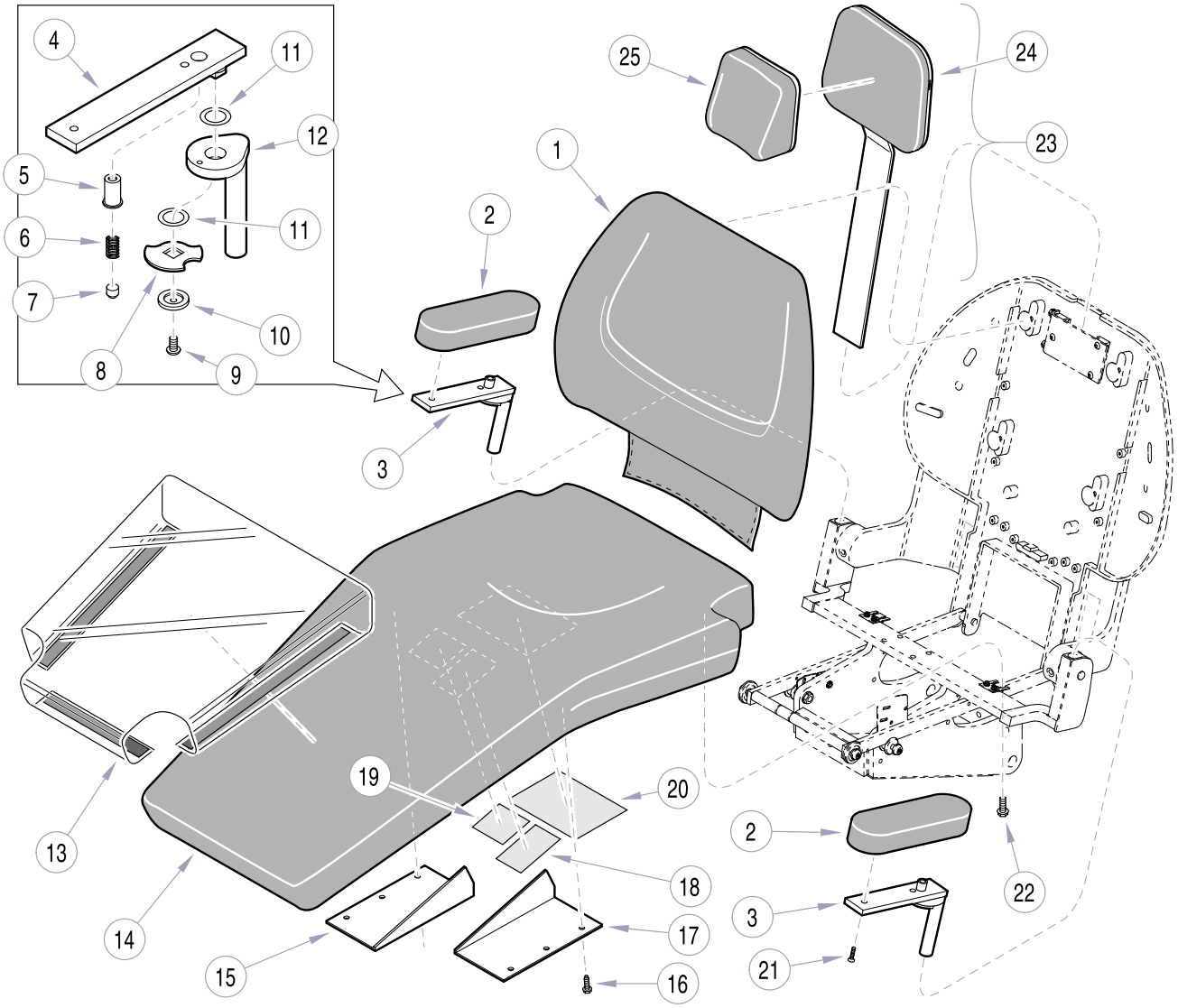
Upholstery Components (Vacuum Form)



NOTE: This model uses Pebble Grey painted components.

KA915700

Item	Part No.	Description	Qty
	154075-xxx	Vacuum Form Upholstery Kit (Includes Items 1 thru 22)	1
1	• 154093-xxx	• Back Rest Upholstery	1
2	• 152636V-xxx	• Arm Rest Cushion	2
3	• 152637-01	• RH Arm Rest Assy (Includes Items 4 thru 12) (Shown Exploded)	1
	• 152638-01	• LH Arm Rest Assy (Includes Items 4 thru 12)	1
4	• • 152675-50	• • Arm Rest Support (1 per Arm Rest)	2
5	• • 122006-2	• • Plunger Housing (1 per Arm Rest)	2
6	• • 121997	• • Spring (1 per Arm Rest)	2
7	• • 121996-3	• • Plunger (1 per Arm Rest)	2
8	• • 122007-50	• • Stop Plate (1 per Arm Rest)	2
9	• • 120950	• • Screw (1 per Arm Rest)	2
10	• • 121954-50	• • Retainer Disk (1 per Arm Rest)	2
11	• • 119034	• • Thrust Race (2 per Arm Rest)	4
12	• • 152674-50	• • Support Hub (1 per Arm Rest)	2
13	• 152898	• Foot Rest Cover (velcro- shown)	1
	148503	Foot Rest Cover (elastic- not shown)	1
14	• 154082-xxx	• Seat Rest Assy (Includes Items 15 thru 20)	1
15	• • 121919-00	• • RH Roller Bracket	1
16	• •121077	• • Screw	6
17	• • 121920-00	• • LH Roller Bracket	1
18	• • 061-0041-00	• • Law Label	1
19	• • 300067	• • CA Compliance Label	1
20	• • 300116	• • Caution Label	1
21	• 118796	• Screw	4
22	• 120718	• Screw	4
23	154077-xxx	Head Rest (Includes Items 24 and 25)	1
24	• 154090-xxx	• Back Board	1
25	• 154089-xxx	• Magnetic Pillow	1

Upholstery Color Suffixes (replaces the [xxx] where found)

Iris Blue	96	Special	99
Slate Grey	103	Mauve	111
Sage	112	Purple Grey	113
Taupe	114	Royal Carriage	124
Soft Pearl	126	Ash	127
Dusty Jadel	128	Wedgewood	129
Cobalt	130	Desert Rose	146

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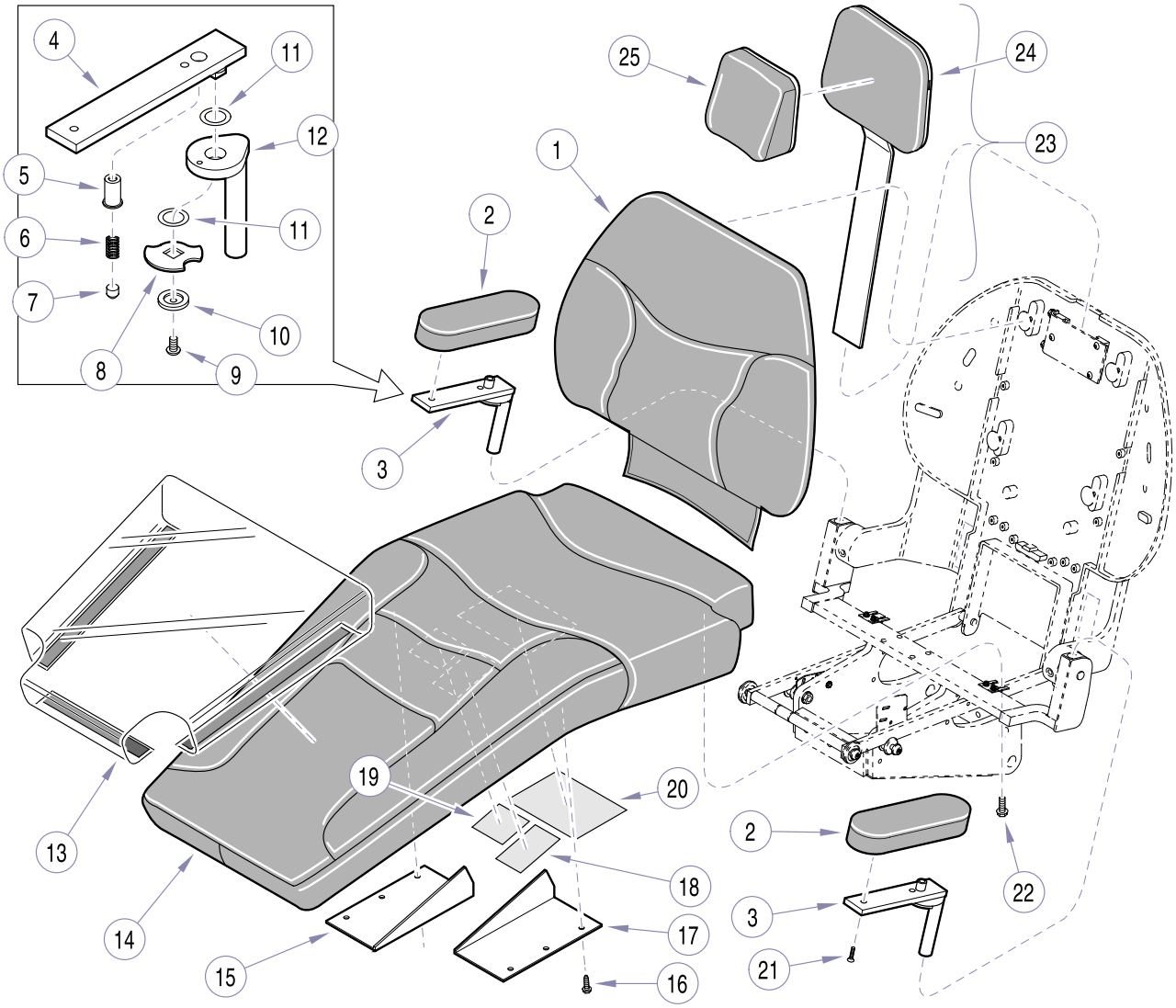
Upholstery Components (Plush)



NOTE: This model uses Sterling Grey painted components.

KA915701

Item	Part No.	Description	Qty
	154046xx	Plush Upholstery Kit (Includes Items 1 thru 22)	1
1	• 153317xx	• Back Rest Upholstery	1
2	• 153316xx	• Arm Rest Cushion	2
3	• 152637	• RH Arm Rest Assy (Includes Items 4 thru 12) (Shown Exploded)	1
	• 152638	• LH Arm Rest Assy (Includes Items 4 thru 12)	1
4	• • 152675-1	• • Arm Rest Support (1 per Arm Rest)	2
5	• • 122006-2	• • Plunger Housing (1 per Arm Rest)	2
6	• • 121997	• • Spring (1 per Arm Rest)	2
7	• • 121996-3	• • Plunger (1 per Arm Rest)	2
8	• • 122007-1	• • Stop Plate (1 per Arm Rest)	2
9	• • 120950	• • Screw (1 per Arm Rest)	2
10	• • 121954-1	• • Retainer Disk (1 per Arm Rest)	2
11	• • 119034	• • Thrust Race (2 per Arm Rest)	4
12	• • 152674-1	• • Support Hub (1 per Arm Rest)	2
13	• 122943	• Foot Rest Cover (velcro- shown)	1
	148503	Foot Rest Cover (elastic- not shown)	1
14	• 153318xx	• Seat Rest Assy (Includes Items 15 thru 20)	1
15	• • 121919-1	• • RH Roller Bracket	1
16	• •121077	• • Screw	6
17	• • 121920-1	• • LH Roller Bracket	1
18	• • 061-0041-00	• • Law Label	1
19	• • 300067	• • CA Compliance Label	1
20	• • 300116	• • Caution Label	1
21	• 118796	• Screw	4
22	• 120718	• Screw	4
23	154048xx	Head Rest (Includes Items 24 and 25)	1
24	• 153320xx	• Back Board	1
25	• 153319xx	• Magnetic Pillow	1

Upholstery Color Suffixes (replaces the [xx] where found)

Apricot	AP	Ash	AS
Bone	BN	Camel	CL
Cobalt	CO	Dark Green	SA
Desert Rose	DR	Dusty Jade	DJ
Greystone	GS	Grey Teal	GL
Mauve	MV	Purple Grey	PG
Saffron	SF	Taupe	TP
Wedgewood	WW	(Special Order)	XX

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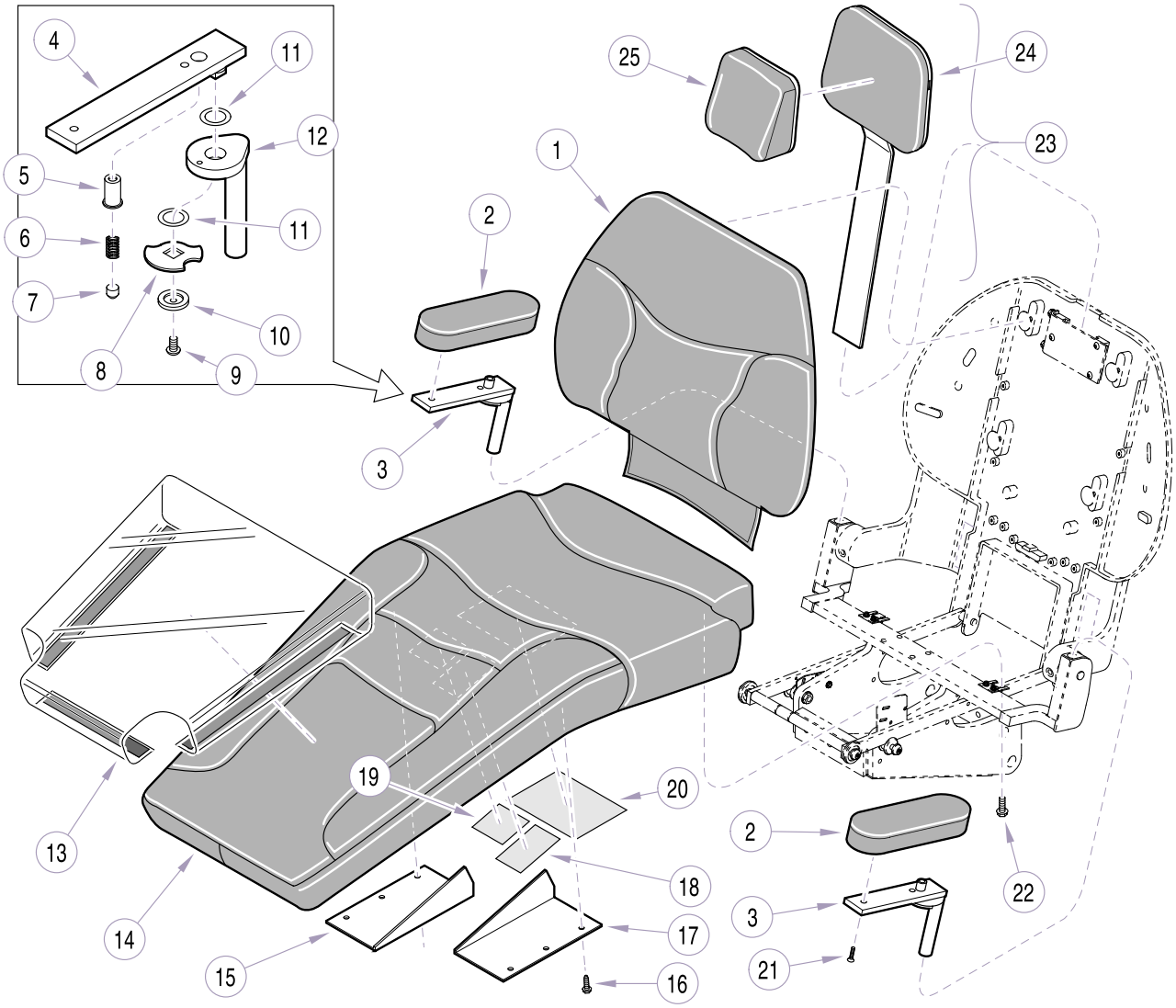
Upholstery Components (Plush)



NOTE: This model uses Pebble Grey painted components.

KA915701

Item	Part No.	Description	Qty
	154076-xxx	Plush Upholstery Kit (Includes Items 1 thru 22)	1
1	• 154094-xxx	• Back Rest Upholstery	1
2	• 153316-xxx	• Arm Rest Cushion	2
3	• 152637-01	• RH Arm Rest Assy (Includes Items 4 thru 12) (Shown Exploded)	1
	• 152638-01	• LH Arm Rest Assy (Includes Items 4 thru 12)	1
4	• • 152675-50	• • Arm Rest Support (1 per Arm Rest)	2
5	• • 122006-2	• • Plunger Housing (1 per Arm Rest)	2
6	• • 121997	• • Spring (1 per Arm Rest)	2
7	• • 121996-3	• • Plunger (1 per Arm Rest)	2
8	• • 122007-50	• • Stop Plate (1 per Arm Rest)	2
9	• • 120950	• • Screw (1 per Arm Rest)	2
10	• • 121954-50	• • Retainer Disk (1 per Arm Rest)	2
11	• • 119034	• • Thrust Race (2 per Arm Rest)	4
12	• • 152674-50	• • Support Hub (1 per Arm Rest)	2
13	• 122943	• Foot Rest Cover (velcro- shown)	1
	148503	Foot Rest Cover (elastic- not shown)	1
14	• 154095-xxx	• Seat Rest Assy (Includes Items 15 thru 20)	1
15	• • 121919-00	• • RH Roller Bracket	1
16	• •121077	• • Screw	6
17	• • 121920-00	• • LH Roller Bracket	1
18	• • 061-0041-00	• • Law Label	1
19	• • 300067	• • CA Compliance Label	1
20	• • 300116	• • Caution Label	1
21	• 118796	• Screw	4
22	• 120718	• Screw	4
23	154076-xxx	Head Rest (Includes Items 24 and 25)	1
24	• 154092-xxx	• Back Board	1
25	• 154091-xxx	• Magnetic Pillow	1

Upholstery Color Suffixes (replaces the [xxx] where found)

Special	99	Apricot	131
Ash	132	Bone	133
Lite Camel	134	Cobalt	135
Dusty Jade	136	Desert Rose	137
Grey Teal	138	Greystone	139
Purple Grey	140	Dark Green	141
Saffron	142	Lite Wedgewood	143
Taupe	144	Mauve	145

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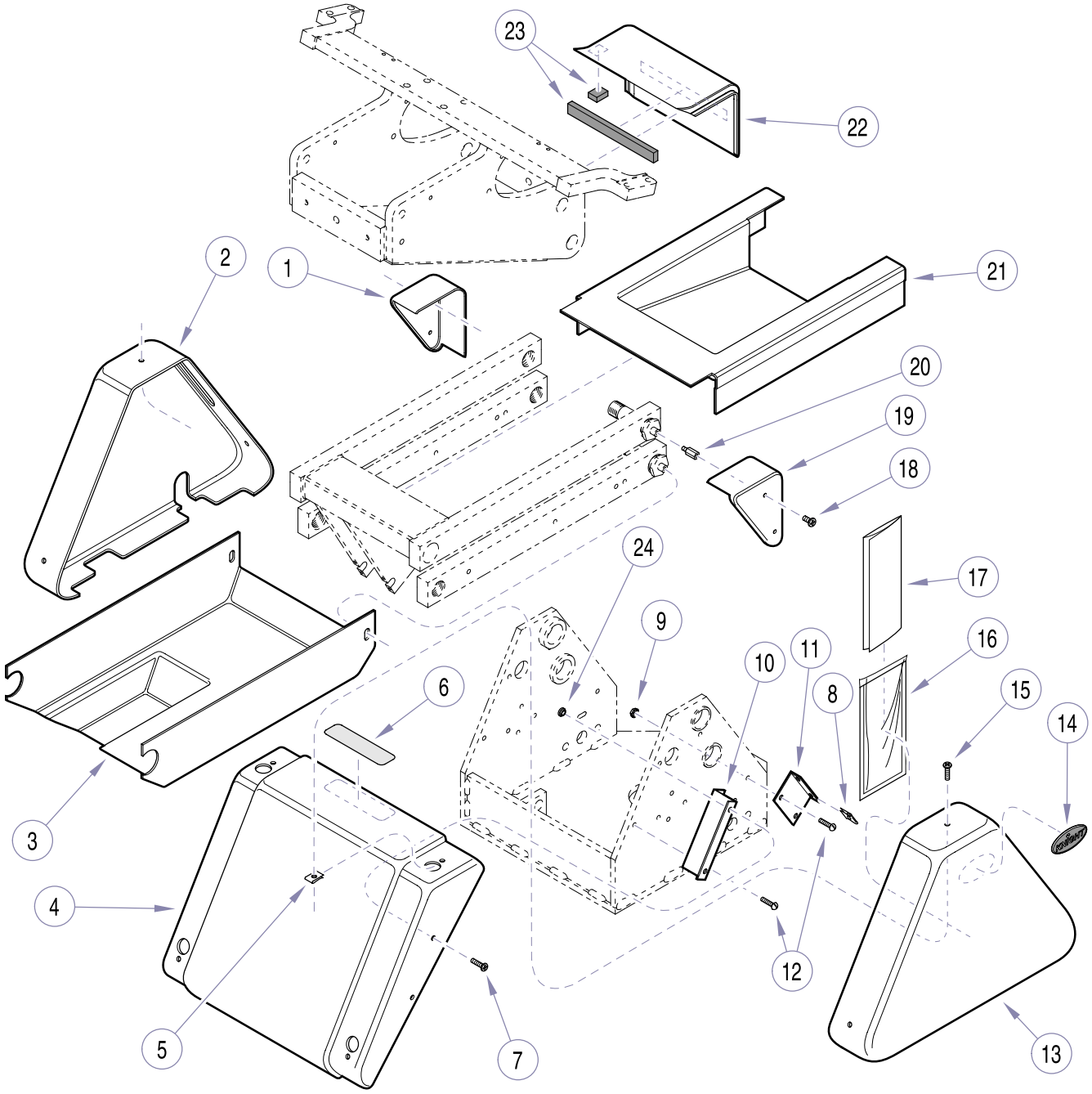
Covers



NOTE: This model uses Sterling Grey painted components.

KA915200

Item	Part No.	Description	Qty
1	121904	RH Platform Cover	1
2	122069	RH Base Cover	1
3	121026	Lower Arm Cover	1
4	121888	Center Base Cover (Biltmore Classic)	1
	122623	Center Base Cover (Concept L/R Clas.)	1
5	121971	Nut Clip	4
6	134969	Electrical Shock Label	1
7	121980-5	Screw	4
8	121972	Nut Clip	2
9	122357	Locknut	2
10	121887-2	Cover Mounting Bracket	2
11	121963-2	Cover Mounting Bracket	2
12	P7017	Screw	6
13	121890	LH Base Cover	1
14	121526	Name Plate	2
15	121980-1	Screw	6
16	134550	Plastic Sleeve	1
17	TP1445	Wiring Diagram	1
18	121981	Screw	4
19	121905	LH Platform Cover	1
20	119610	Standoff	4
21	121027	Upper Arm Cover	1
22	121903	Center Platform Cover (Includes Item 23)	1
23	• 275479	• Foam Spacer Material	AR
24	117977	Self-Clinch Nut	4

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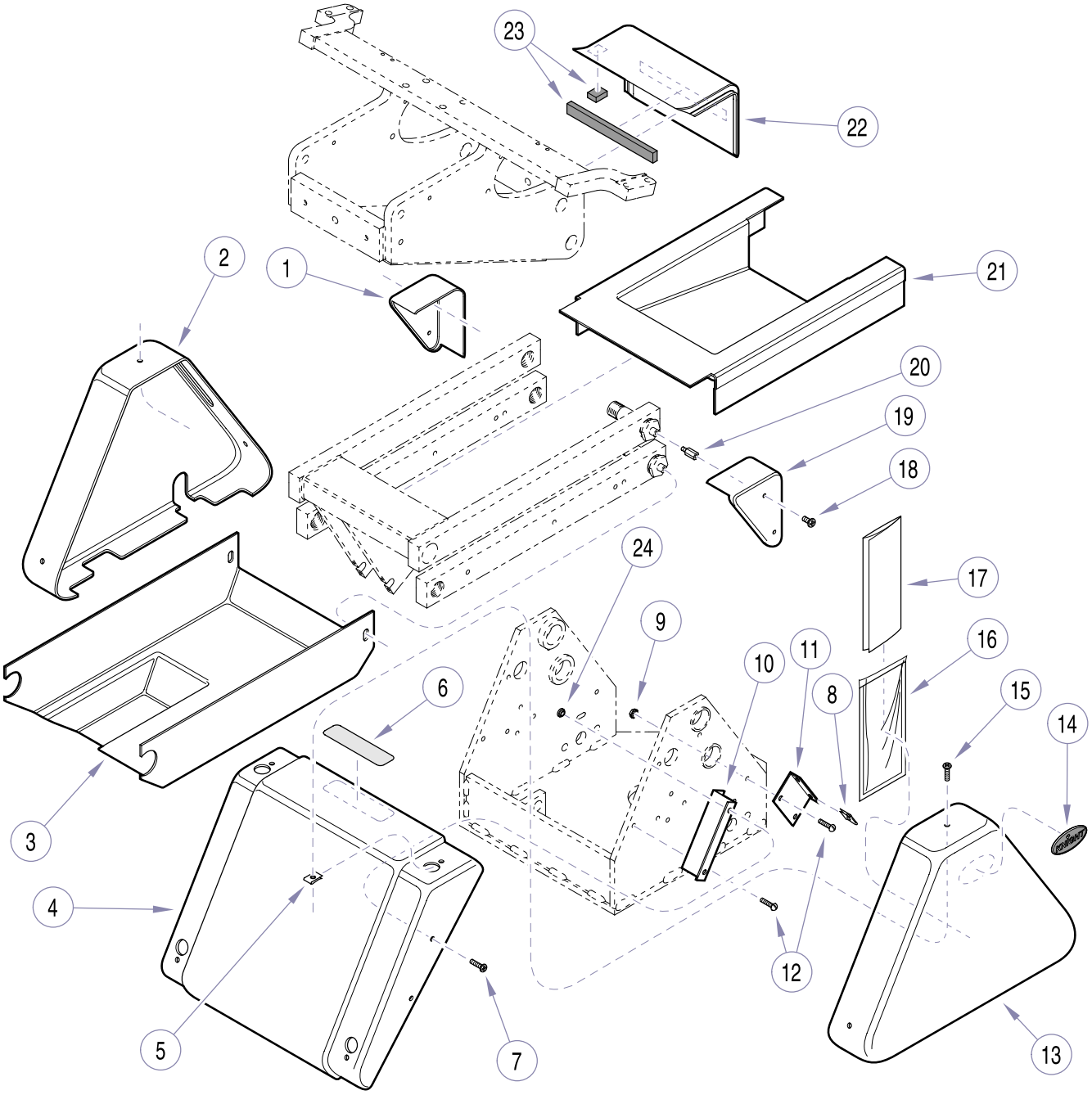
Covers



NOTE: This model uses Pebble Grey painted components.

KA915200

Item	Part No.	Description	Qty
1	121904-01	RH Platform Cover	1
2	122069-01	RH Base Cover	1
3	121026-01	Lower Arm Cover	1
4	121888-01	Center Base Cover (Biltmore Classic)	1
	122623-01	Center Base Cover (Concept L/R Clas.)	1
5	121971	Nut Clip	4
6	561-0262-01	Electrical Shock Label	1
7	105480	Screw	4
8	121972	Nut Clip	2
9	122357	Locknut	2
10	121887-2	Cover Mounting Bracket	2
11	121963-2	Cover Mounting Bracket	2
12	P7017	Screw	6
13	121890-01	LH Base Cover	1
14	061-0803-00	Name Plate	2
15	121980-50	Screw	6
16	134550	Plastic Sleeve	1
17	TP1445	Wiring Diagram	1
18	121981-50	Screw	4
19	121905-01	LH Platform Cover	1
20	119610	Standoff	4
21	121027-01	Upper Arm Cover	1
22	121903-01	Center Platform Cover (Includes Item 23)	1
23	• 275479	• Foam Spacer Material	AR
24	117977	Self-Clinch Nut	4

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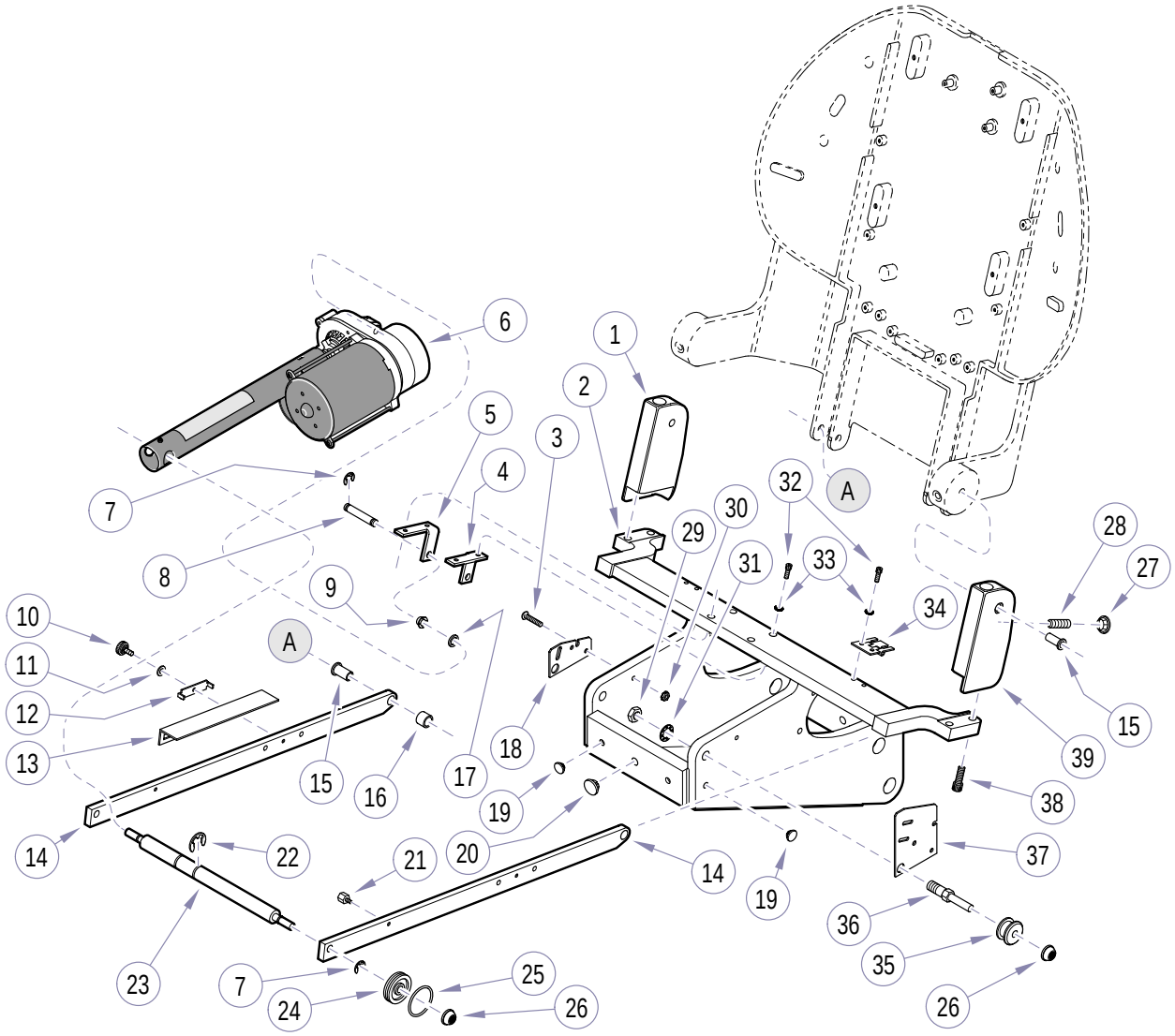
Seat Components



NOTE: This model uses Sterling Grey painted components.

KA914901i

Item	Part No.	Description	Qty
1	121951-6	RH Hip Post Assy (Includes Item 15)	1
2	152624-1	Platform Assy	1
3	102127	Screw	2
4	119737-1	LH Bracket	1
5	119738-1	RH Bracket	1
6		Top Motor Assembly (See “Top Motor Assembly” Elsewhere)	1
7	042-0007-00	Retaining Ring	4
8	119741-2	Top Motor Pin	1
9	053-0114-00	Nylon Bushing	2
10	149730	Thumb Screw	1
11	P1673	Washer	1
12	121930-1	Clamping Plate *(Earlier Units)*	1
13	121931-1	Adjustable Plate	1
14	152628	RH Seat Support Assy (Includes Items 15 and 16) (Shown Exploded)	1
	152629	LH Seat Support Assy (Includes Items 15 and 16)	1
15	• 121923	• Flange Bearing (1 per Assy)	4
16	• 121924-1	• Bearing Cover (1 per Assy)	2
17		Washer (Refer to “Top Motor Assembly” elsewhere)	1
18	121928-1	Program Switch Plate	1
19	121968-1	Hole Plug	4
20	121969-1	Hole Plug	1
21	119610	Standoff	1
22	119745	E-Ring	2
23	121921-2	Tow Bar Shaft	1
24	112383-6	Legrest Support Roller	2
25	C6699	O-Ring	2
26	121967	Push Cap Nut	4
27	121985-1	Hole Plug	2
28	122816	Set Screw	2
29	C1079	Nut	2
30	122357	Lock Nut	2
31	119537	Lock Washer	2
32	106657	Screw	8
33	C2563	Lock Washer	8
34	118249-2	Leg Rest Hinge	2
35	121934	Tow Bar Roller	2
36	121942-2	Tow Bar Roller Shaft	2
37	121929-1	Limit Switch Plate	1
38	C4983	Screw	4
39	121952-6	LH Hip Post Assy (Includes Item 15)	1

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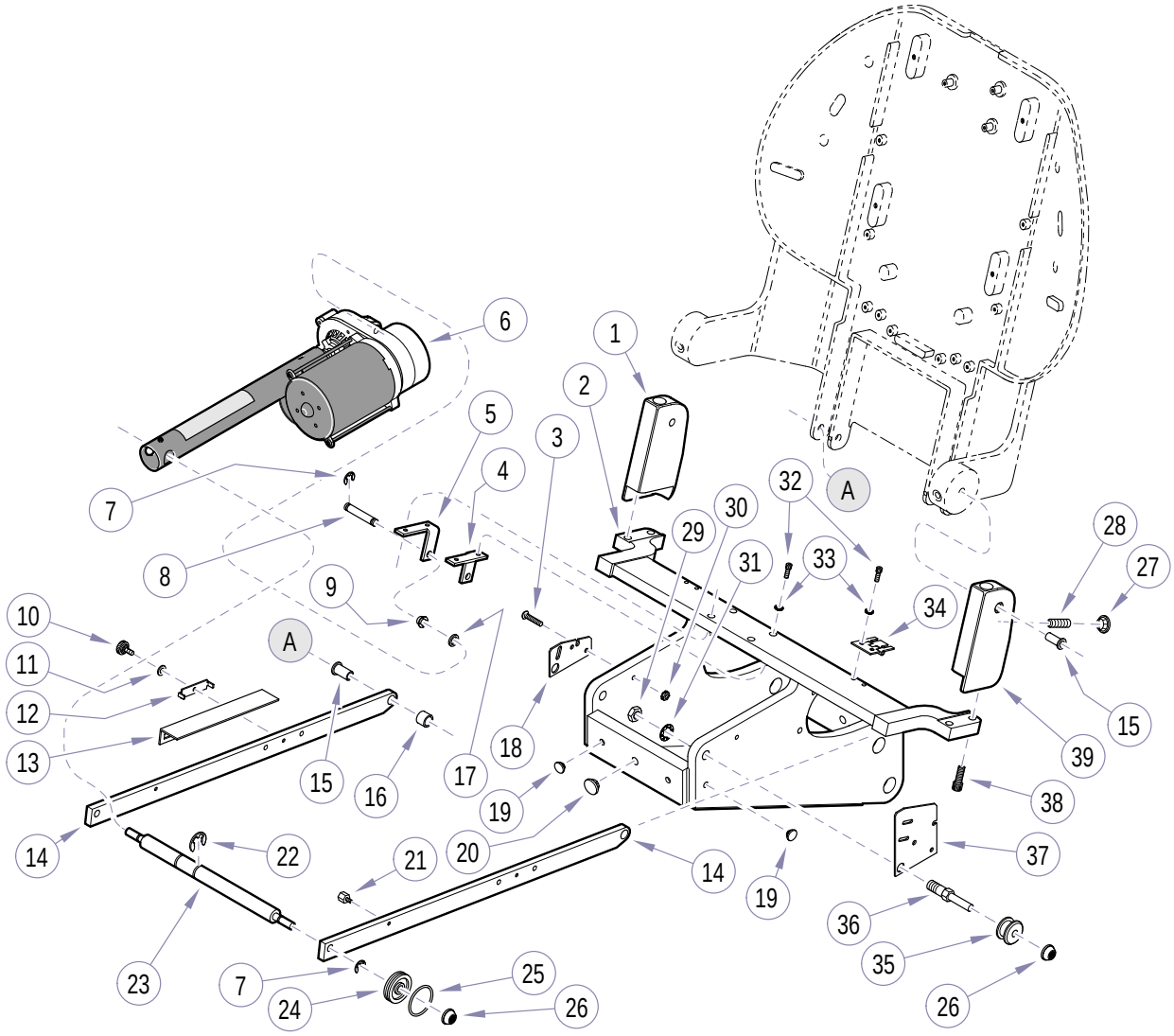
Seat Components



NOTE: This model uses Pebble Grey painted components.

KA914901i

Item	Part No.	Description	Qty
1	121951-01	RH Hip Post Assy (Includes Item 15)	1
2	152624-00	Platform Assy	1
3	102127	Screw	2
4	119737-50	LH Bracket	1
5	119738-50	RH Bracket	1
6		Top Motor Assembly (See “Top Motor Assembly” Elsewhere)	1
7	042-0007-00	Retaining Ring	4
8	119741-2	Top Motor Pin	1
9	053-0114-00	Nylon Bushing	2
10	149730	Thumb Screw	1
11	P1673	Washer	1
12	121930-50	Clamping Plate	1
13	121931-50	Adjustable Plate	1
14	152628-01	RH Seat Support Assy (Includes Items 15 and 16) (Shown Exploded)	1
	152629-01	LH Seat Support Assy (Includes Items 15 and 16)	1
15	• 121923	• Flange Bearing (1 per Assy)	4
16	• 121924-50	• Bearing Cover (1 per Assy)	2
17		Washer (Refer to “Top Motor Assembly” elsewhere)	1
18	121928-50	Program Switch Plate	1
19	053-1333-50	Hole Plug	4
20	120236	Hole Plug	1
21	119610	Standoff	1
22	119745	E-Ring	2
23	121921-2	Tow Bar Shaft	1
24	112383-6	Legrest Support Roller	2
25	C6699	O-Ring	2
26	121967	Push Cap Nut	4
27	121985-50	Hole Plug	2
28	122816	Set Screw	2
29	C1079	Nut	2
30	122357	Lock Nut	2
31	119537	Lock Washer	2
32	106657	Screw	8
33	C2563	Lock Washer	8
34	118249-2	Leg Rest Hinge	2
35	121934	Tow Bar Roller	2
36	121942-2	Tow Bar Roller Shaft	2
37	121929-50	Limit Switch Plate	1
38	C4983	Screw	4
39	121952-01	LH Hip Post Assy (Includes Item 15)	1

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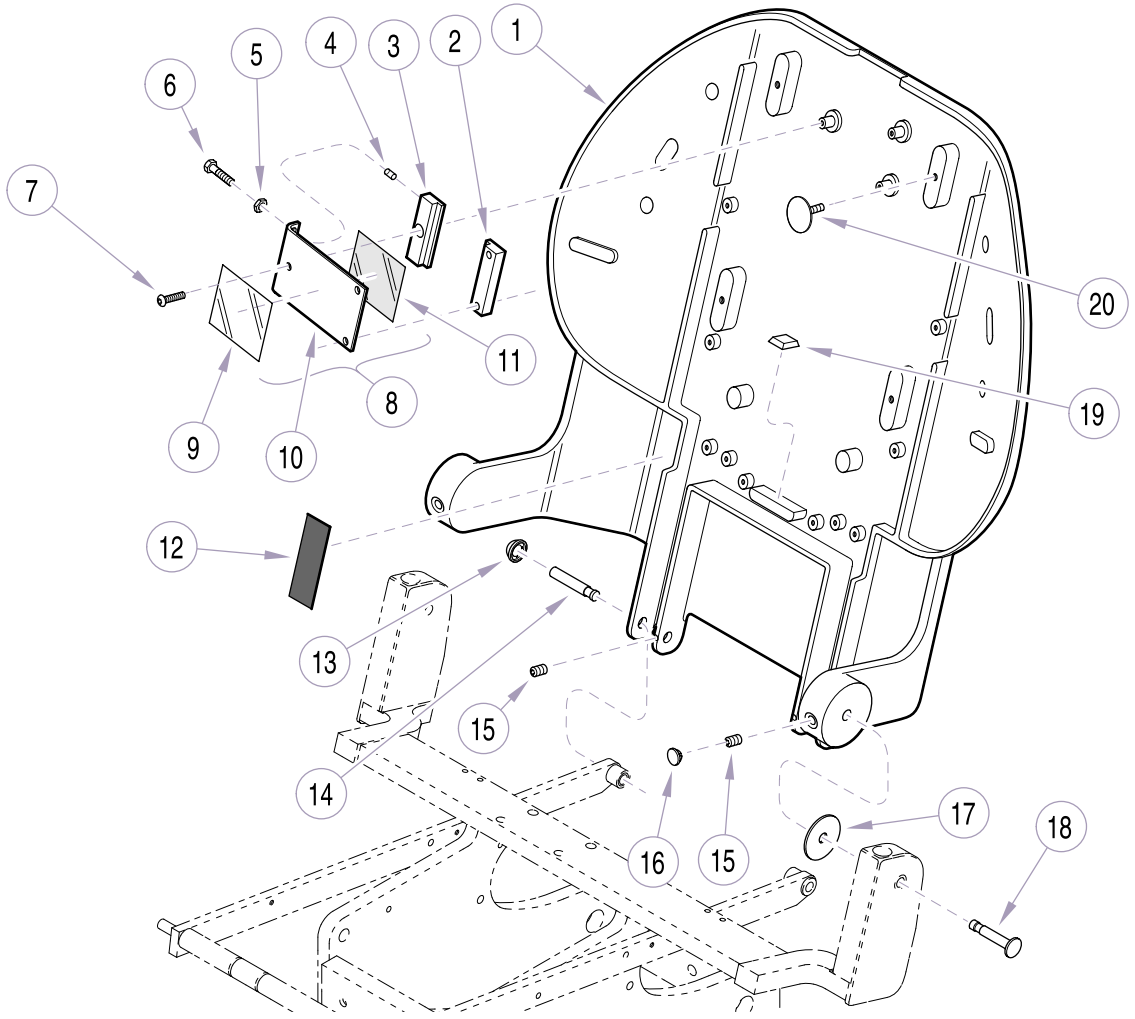
Back Components



NOTE: This model uses Sterling Grey painted components.

KA915100

Item	Part No.	Description	Qty
1	121966-1	Chair Back [With switch mtg. holes] (Biltmore Classic Only)	1
	121881-1	Chair Back [Without switch mtg. holes] (Concept L/R Classic Only)	1
2	121943	Fixed Tang Guide	1
3	120975	Floating Tang Guide	1
4	120976	Tang Guide Compensator	2
5	P1215	Nut	2
6	108850	Screw	2
7	120716-2	Screw	3
8	152094	Tang Guide Plate Assembly (Includes Items 9 thru 11)	1
9	• 121055	• Headrest Adjustment Label	1
10	• 120955-1	• Tang Guide Plate	1
11	• 120981	• Tang Bearing	1
12	275505	Velcro Loop	2
13	121967	Push Nut Cap	2
14	121926-2	Pin	2
15	120102	Set Screw	4
16	121968-1	Hole Plug	2
17	121944	Flat Washer	2
18	121927-1	Hip Pin	2
19	108965	Bumper	1
20	122021	Elevator Bolt	4

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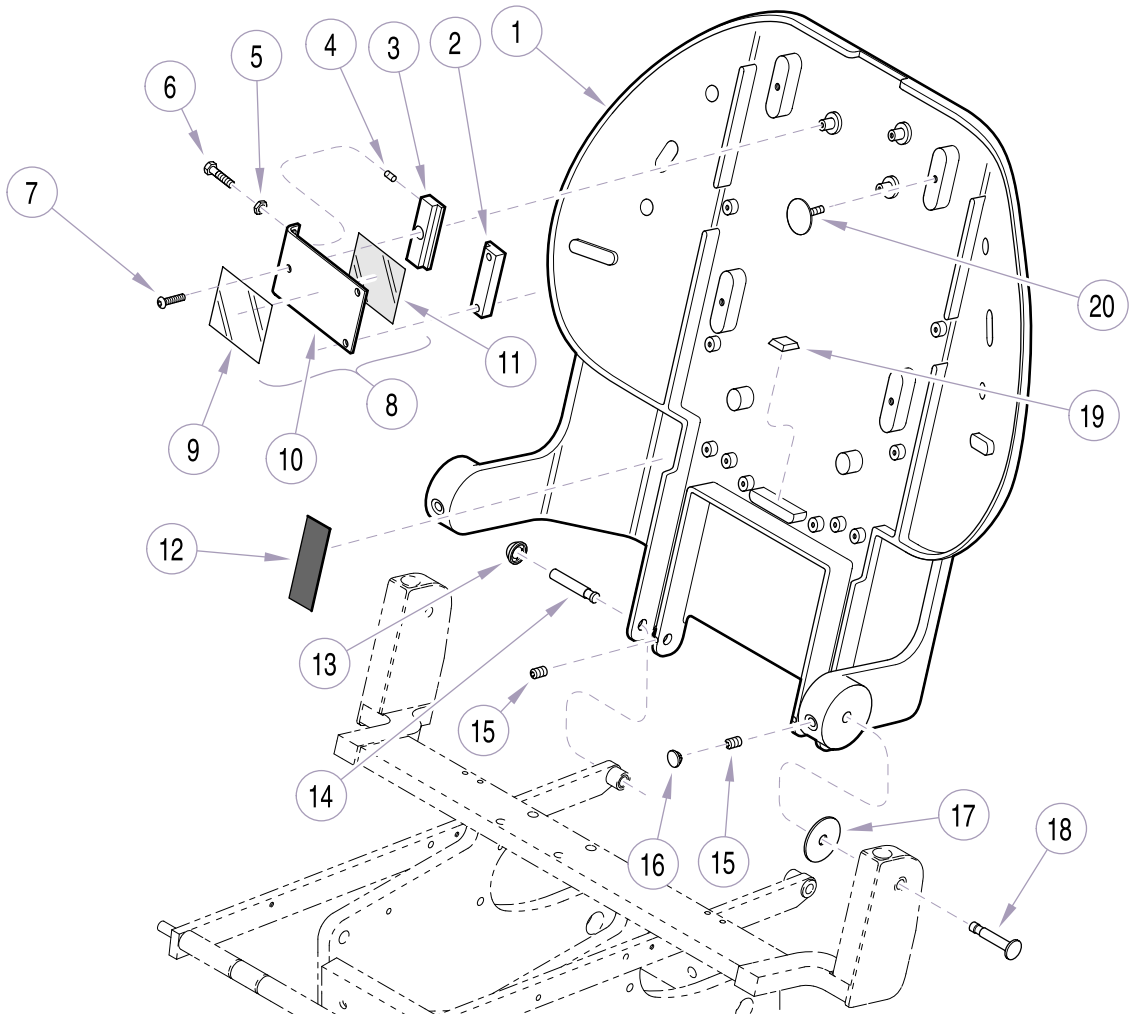
Back Components



NOTE: This model uses Pebble Grey painted components.

KA915100

Item	Part No.	Description	Qty
1	121966-00	Chair Back [With switch mtg. holes] (Biltmore Classic Only)	1
	121881-00	Chair Back [Without switch mtg. holes] (Concept L/R Classic Only)	1
2	121943	Fixed Tang Guide	1
3	120975	Floating Tang Guide	1
4	120976	Tang Guide Compensator	2
5	P1215	Nut	2
6	108850	Screw	2
7	120716-2	Screw	3
8	152094-01	Tang Guide Plate Assembly (Includes Items 9 thru 11)	1
9	• 121055	• Headrest Adjustment Label	1
10	• 120955-50	• Tang Guide Plate	1
11	• 120981	• Tang Bearing	1
12	275505	Velcro Loop	2
13	121967	Push Nut Cap	2
14	121926-2	Pin	2
15	120102	Set Screw	4
16	053-1333-50	Hole Plug	2
17	121944	Flat Washer	2
18	121927-00	Hip Pin	2
19	108965	Bumper	1
20	122021	Elevator Bolt	4

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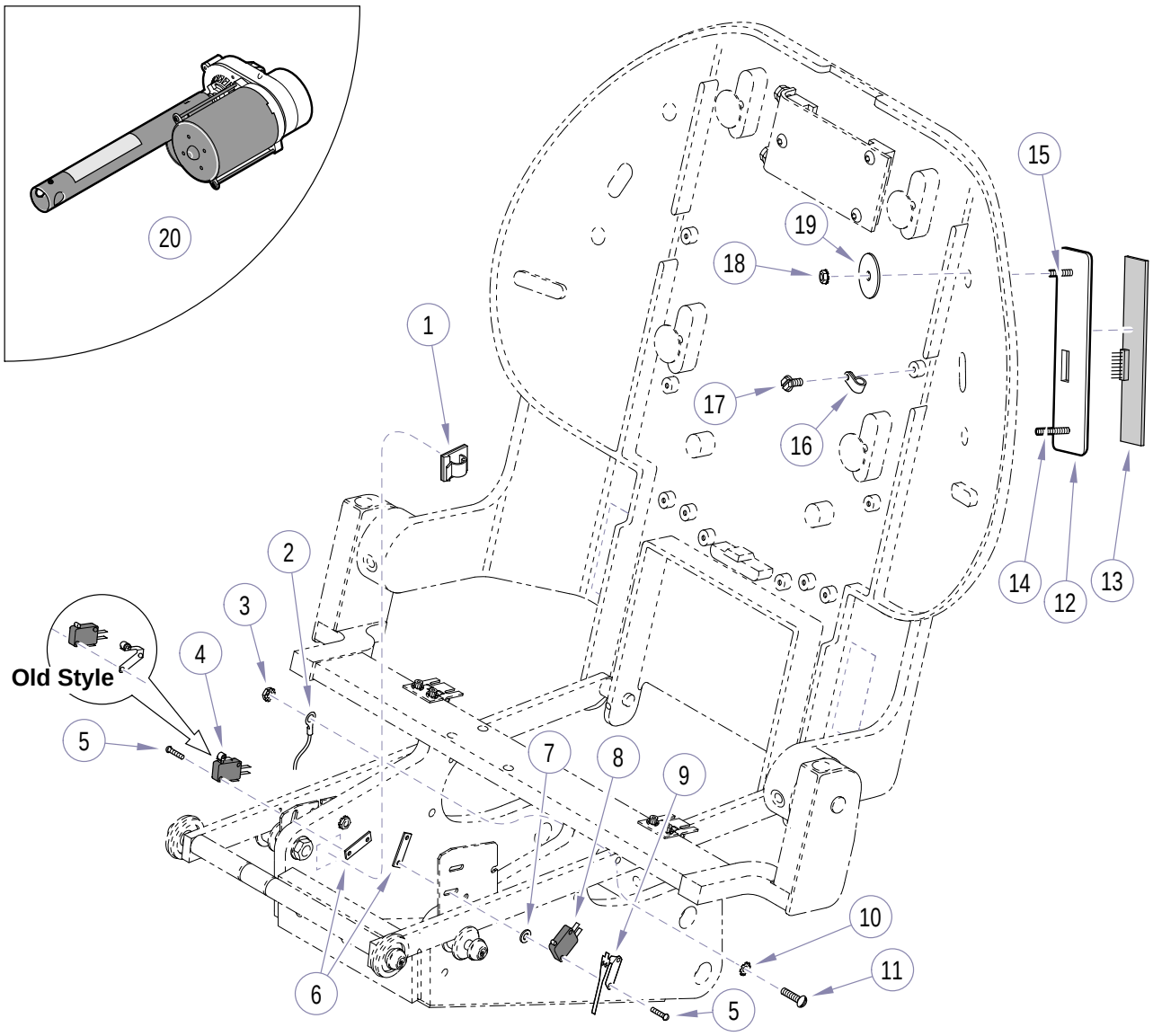
Top Electrical Components



NOTE: This model uses Sterling Grey painted components.

KA916002

Item	Part No.	Description	Qty
1	109191	Cord Clip	6
2		Ground Wire (See Wiring Diagram in Section V)	1
3	122357	Lock Nut	1
4	122994	Micro Switch w/ Roller (Replaces Old Style)	1
5	152373	Screw	4
6	4P429	Nut Bar	2
7	P1673	Washer	2
8	146978	Micro Switch	1
9	119633	Actuator	1
10	P14718	Lock Washer	1
11	102217	Screw	1
12	122008-1	Switch Bezel (Biltmore Classic Only)	2
13	120060	Membrane Switch (Biltmore Clas. Only)	2
14	122010	Stud [0.875 in.] (Biltmore Classic Only)	2
15	122009	Stud [0.625 in.] (Biltmore Classic Only)	2
16	121655	Cable Clamp (Biltmore Classic Only)	7
17		Screw (Biltmore Classic Only)	6
18	122357	Lock Nut (Biltmore Classic Only)	4
19	119758	Washer (Biltmore Classic Only)	1
20		Top Motor Assy (Refer to “Top Motor Assembly” elsewhere. Refer to “Seat Components” for connecting hardware.)	1

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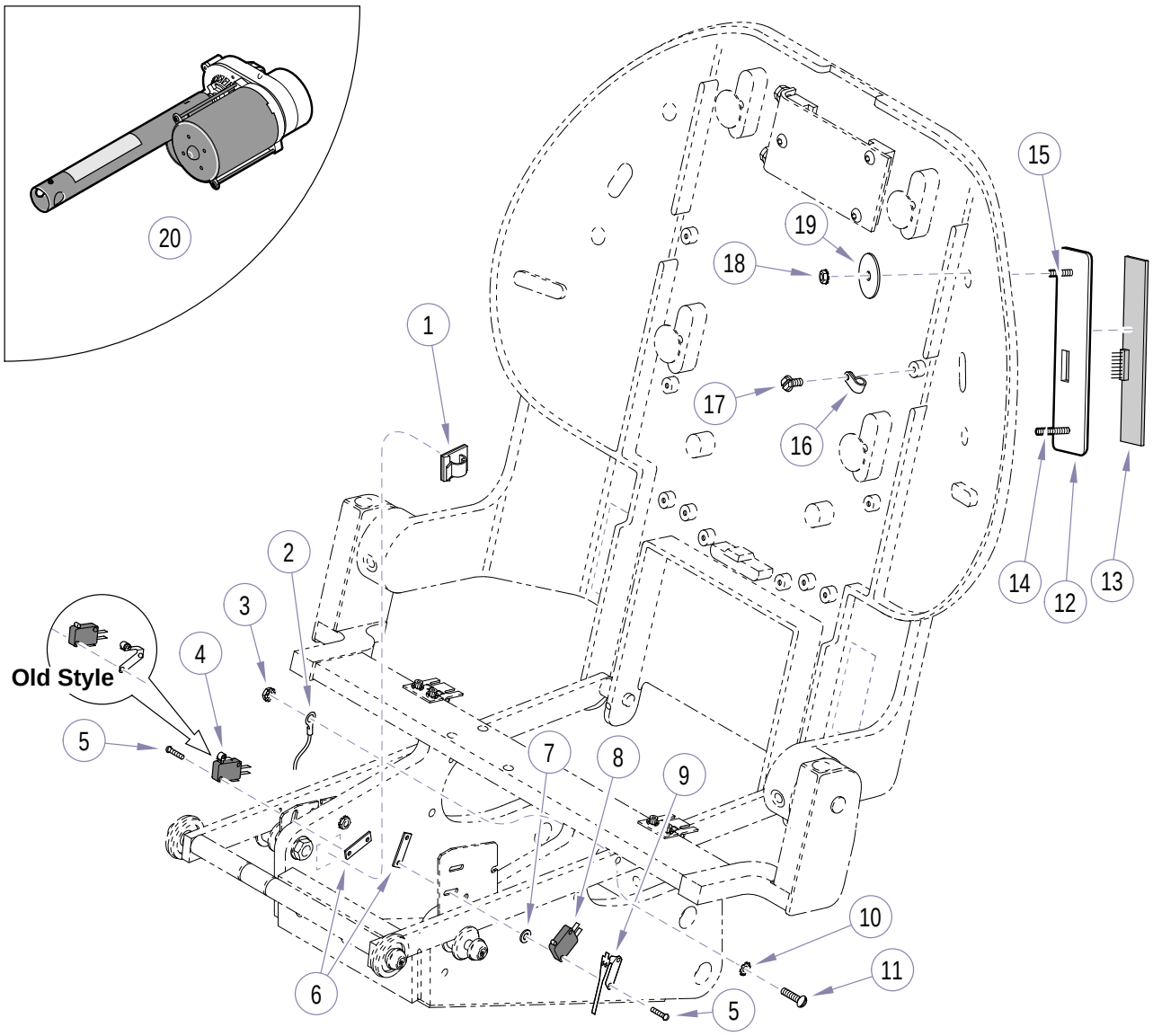
Top Electrical Components



NOTE: This model uses Pebble Grey painted components.

KA916002

Item	Part No.	Description	Qty
1	109191	Cord Clip	6
2		Ground Wire (See Wiring Diagram in Section V)	1
3	122357	Lock Nut	1
4	122994	Micro Switch w/ Roller (Replaces Old Style)	1
5	152373	Screw	4
6	4P429	Nut Bar	2
7	P1673	Washer	2
8	146978	Micro Switch	1
9	119633	Actuator	1
10	P14718	Lock Washer	1
11	102217	Screw	1
12	122008-00	Switch Bezel (Biltmore Classic Only)	2
13	120060	Membrane Switch (Biltmore Clas. Only)	2
14	122010	Stud [0.875 in.] (Biltmore Classic Only)	2
15	122009	Stud [0.625 in.] (Biltmore Classic Only)	2
16	121655	Cable Clamp (Biltmore Classic Only)	7
17		Screw (Biltmore Classic Only)	6
18	122357	Lock Nut (Biltmore Classic Only)	4
19	119758	Washer (Biltmore Classic Only)	1
20		Top Motor Assy (Refer to “Top Motor Assembly” elsewhere. Refer to “Seat Components” for connecting hardware.)	1

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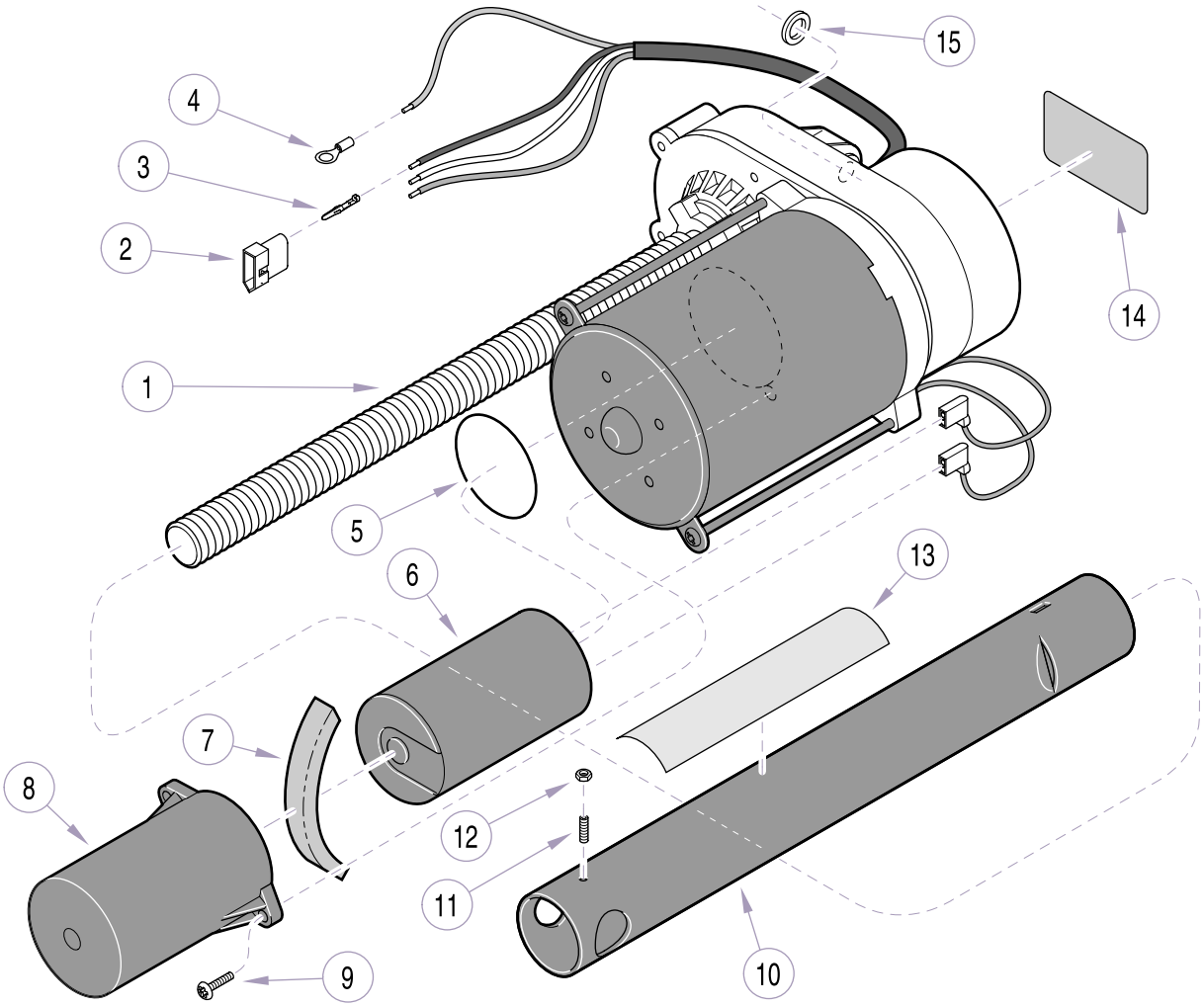
Top Motor Assembly



KA915000

Item	Part No.	Description	Qty
1	151900	Top Motor Assembly (120-volt) (Includes Items 2 thru 15)	1
	151458	Top Motor Assembly (240-volt) (Includes Items 2 thru 15)	1
2	• 101927	• Connector	1
3	• 101928	• Terminal (Male)	3
4	• P17087	• Terminal (#10)	1
5	•	• Insulator	1
6	• 002-0733-00	• Capacitor Kit (120-volt) (Includes Velcro)	1
	• 002-0734-00	• Capacitor Kit (240-volt) (Includes Velcro)	1
7	•	• Foam Spacer	1
8	• 053-1379-00	• Capacitor Cover	1
9	•	• Screw	2
10	•	• Translating Tube	1
11	• 120913	• Set Screw	1
12	• P507	• Nut	1
13	• 120116	• Motor Shaft Warning Label	1
14	• TP1158	• Motor Label	1
15	• 122056	• Washer	1

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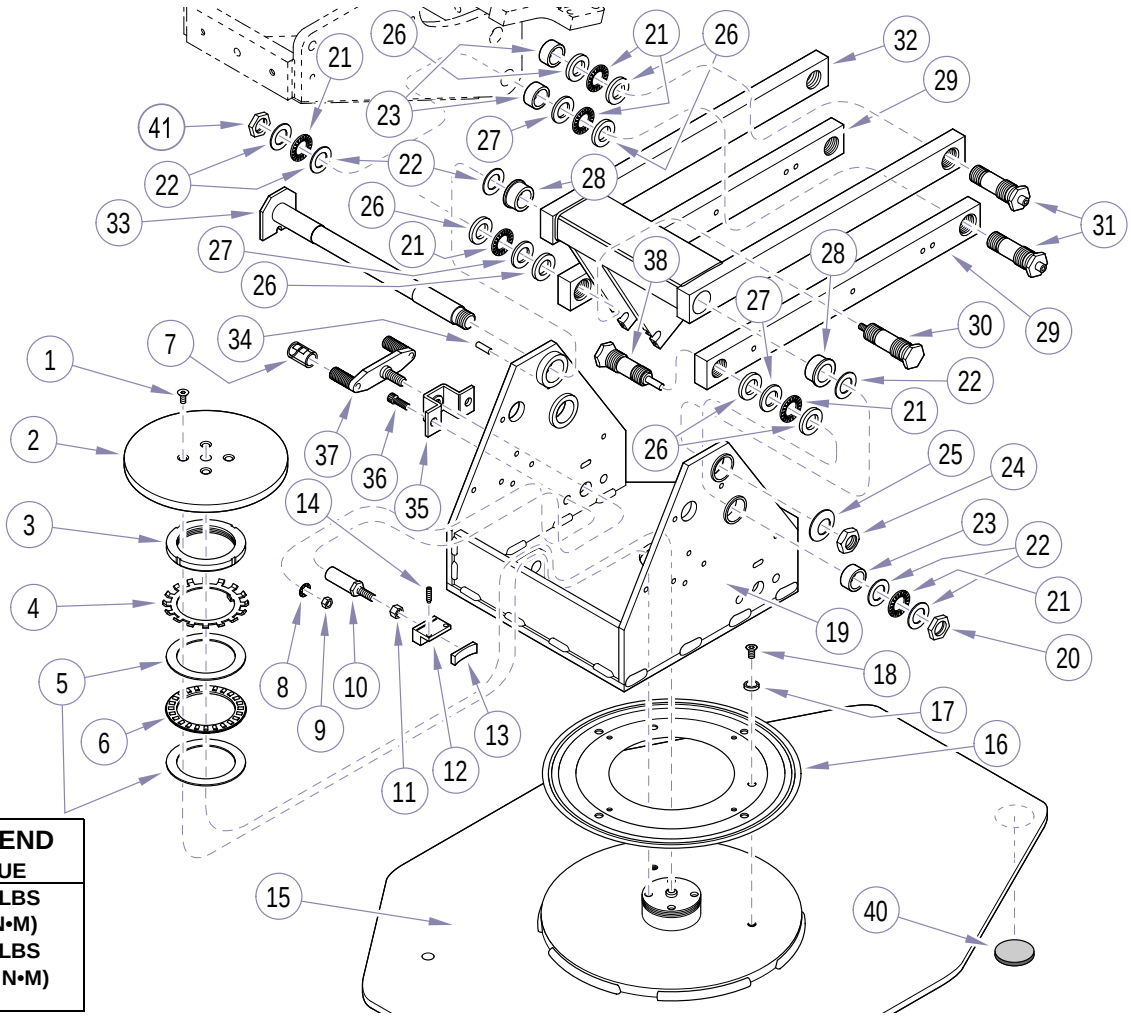
Rotational Base Components (Biltmore Classic)



TORQUE LEGEND	
ITEM#	TORQUE
20	10 FT-LBS (13.6 N•M)
30, 31, 38	75 FT-LBS (101.7 N•M)

NOTE: This model uses Sterling Grey painted components.

KA914802

Item	Part No.	Description	Qty
1	157122	Screw	4
2	119896-1	Brake Disk	1
3	119298	Bearing Lock Nut	1
4	119296	Bearing Lock Washer	1
5	119295	Bearing Race	2
6	119297	Thrust Bearing	1
7	122627	Sleeve	2
8	C4507	Lock Washer	2
9	C1269	Nut	2
10	119882-2	Rotation Lock Stud	1
11	119513	Nut	1
12	151446	Rotation Block Assy (Includes Item 13)	1
13	•	• Brake Lining	1
14	121148	Set Screw	2
15	152642	Baseplate	1
16	117150	Lazy Susan Bearing	1
17	119427-2	Rotation Stop	2
18	119319	Screw	2
19	151168	Upright Housing Assy	1
20	119031-2	Nut	2
21	119033	Thrust Bearing (Apply 185171 Magnalube) (See Item 39)	12
22	119034	Thrust Race (1/32") (See Item 39)	14
23	119058	Bearing	6
24	041-0625-00	Nut	1
25	111534	Spring Washer	1
26	119035	Thrust Race (1/8") (See Item 39)	10
27	155287	Washer (See Item 39)	4
28	117086	Bearing	2
29	121521-1	Parallel Arm	2
30	151326	Cam Stud Pivot Screw Assy	1
31	120024-2	Pivot Screw	4
32	151159-1	Lift Arm	1
33	149296-2	Shaft Assy	1
34	117518	Groove Pin	1
35	151445-1	Bracket Assy	1
36	C5253	Screw	2
37	151447-1	Lever Assy (Apply 185171 Magnalube to Threads)	1
38	151336	Groove Pin Pivot Screw Assy	1
39	152621	Thrust Bearing Kit (Not Shown) (Includes Items 21, 22, 26, 27 in quantities listed Also Includes Magnalube and Loctite).	
40	118286	Chair Base Pad	4
41	041-0750-02	Nut	4

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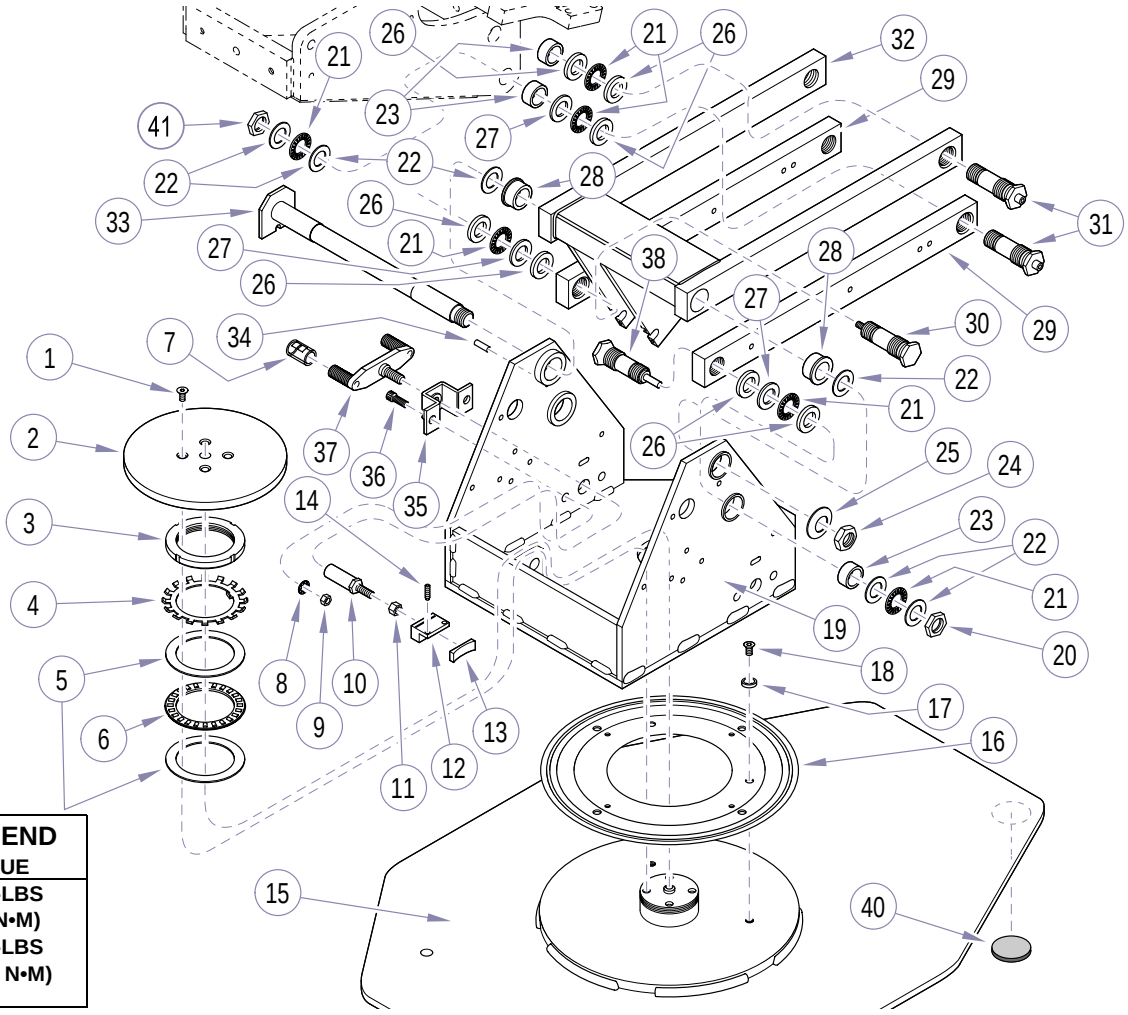
Rotational Base Components (Biltmore Classic)



TORQUE LEGEND	
ITEM#	TORQUE
20	10 FT-LBS (13.6 N•M)
30, 31, 38	75 FT-LBS (101.7 N•M)

NOTE: This model uses Pebble Grey painted components.

KA914801i

Item	Part No.	Description	Qty
1	157122	Screw	4
2	119896-1	Brake Disk	1
3	119298	Bearing Lock Nut	1
4	119296	Bearing Lock Washer	1
5	119295	Bearing Race	2
6	119297	Thrust Bearing	1
7	122627	Sleeve	2
8	C4507	Lock Washer	2
9	C1269	Nut	2
10	119882-2	Rotation Lock Stud	1
11	119513	Nut	1
12	151446	Rotation Block Assy (Includes Item 13)	1
13	•	• Brake Lining	1
14	121148	Set Screw	2
15	152642-00	Baseplate	1
16	117150	Lazy Susan Bearing	1
17	119427-2	Rotation Stop	2
18	119319	Screw	2
19	151168-00	Upright Housing Assy	1
20	119031-2	Nut	2
21	119033	Thrust Bearing (Apply 185171 Magnalube) (See Item 39)	12
22	119034	Thrust Race (1/32") (See Item 39)	14
23	119058	Bearing	6
24	041-0625-00	Nut	1
25	111534	Spring Washer	1
26	119035	Thrust Race (1/8") (See Item 39)	10
27	155287	Washer (See Item 39)	4
28	117086	Bearing	2
29	121521-00	Parallel Arm	2
30	151326	Cam Stud Pivot Screw Assy	1
31	120024-2	Pivot Screw	4
32	151159-00	Lift Arm	1
33	149296-2	Shaft Assy	1
34	117518	Groove Pin	1
35	151445-00	Bracket Assy	1
36	C5253	Screw	2
37	151447-00	Lever Assy (Apply 185171 Magnalube to Threads)	1
38	151336	Groove Pin Pivot Screw Assy	1
39	152621	Thrust Bearing Kit (Not Shown) (Includes Items 21, 22, 26, 27 in quantities listed Also Includes Magnalube and Loctite).	
40	118286	Chair Base Pad	4
41	041-0750-02	Nut	4

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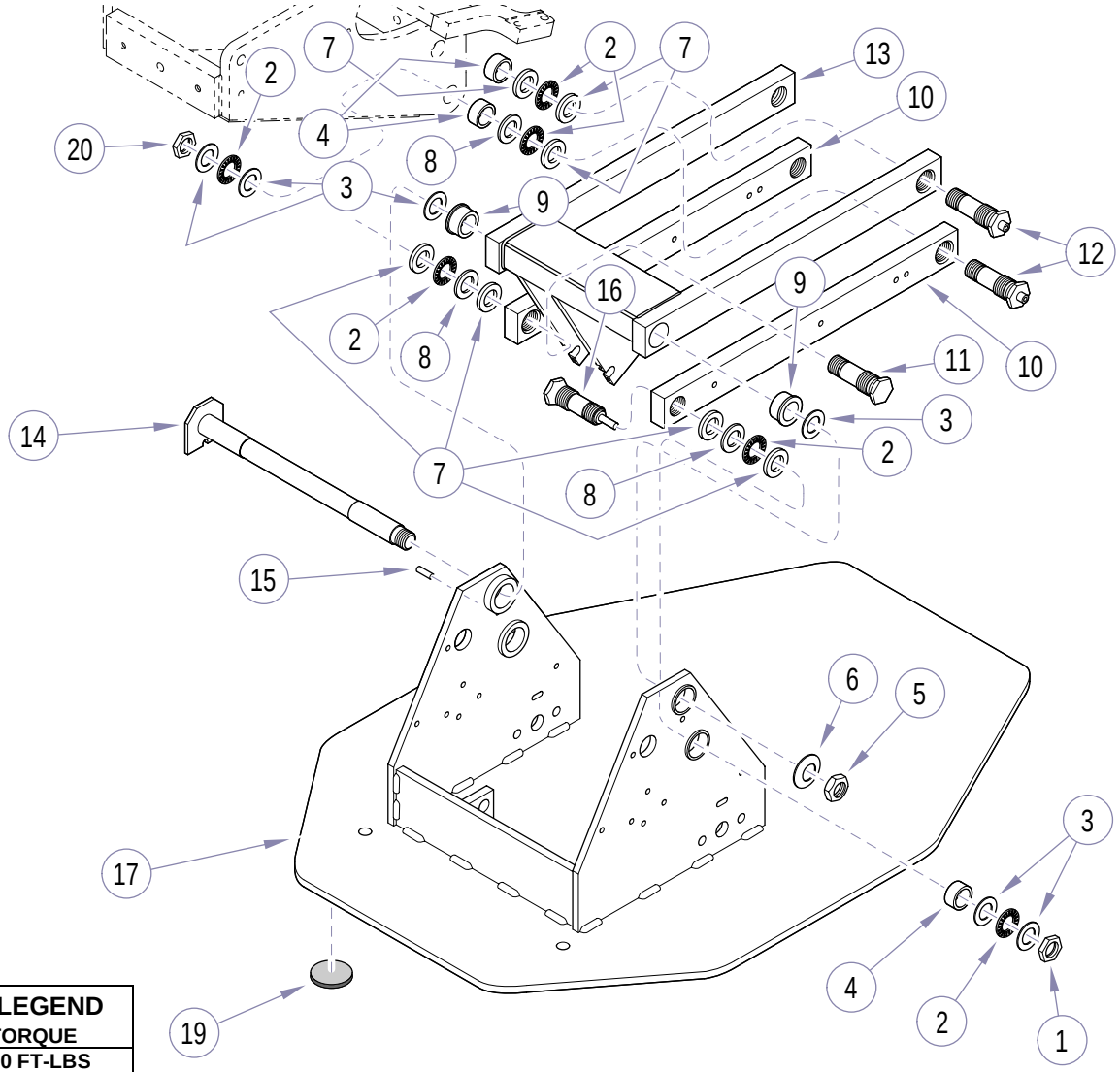
Non-Rotational Base Components (Concept L/R Classic)



TORQUE LEGEND	
ITEM#	TORQUE
1	10 FT-LBS (13.6 N•M)
11, 12, 16	75 FT-LBS (101.7 N•M)

NOTE: This model uses Sterling Grey painted components.

KA924501i

Item	Part No.	Description	Qty
1	119031-2	Nut	2
2	119033	Thrust Bearing (Apply 185171 Magnalube) (See Item 18)	12
3	119034	Thrust Race (1/32") (See Item 18)	14
4	119058	Bearing	6
5	041-0625-00	Nut	1
6	111534	Spring Washer	1
7	119035	Thrust Race (1/8") (See Item 18)	10
8	155287	Washer (See Item 18)	4
9	117086	Bearing	2
10	121521-1	Parallel Arm	2
11	120025-2	Pivot Screw	1
12	120024-2	Pivot Screw	4
13	151159-1	Lift Arm	1
14	149296-2	Shaft Assy	1
15	117518	Groove Pin	1
16	151336	Groove Pin Pivot Screw Assy	1
17	153167-1	Base Plate Weldment	1
18	152621	Thrust Bearing Kit (Not Shown) (Includes Items 2, 3, 7 and 8 in quantities listed. Also Includes Magnalube and Loctite).	
19	118286	Chair Base Pad	4
20	041-0750-02	Nut	4

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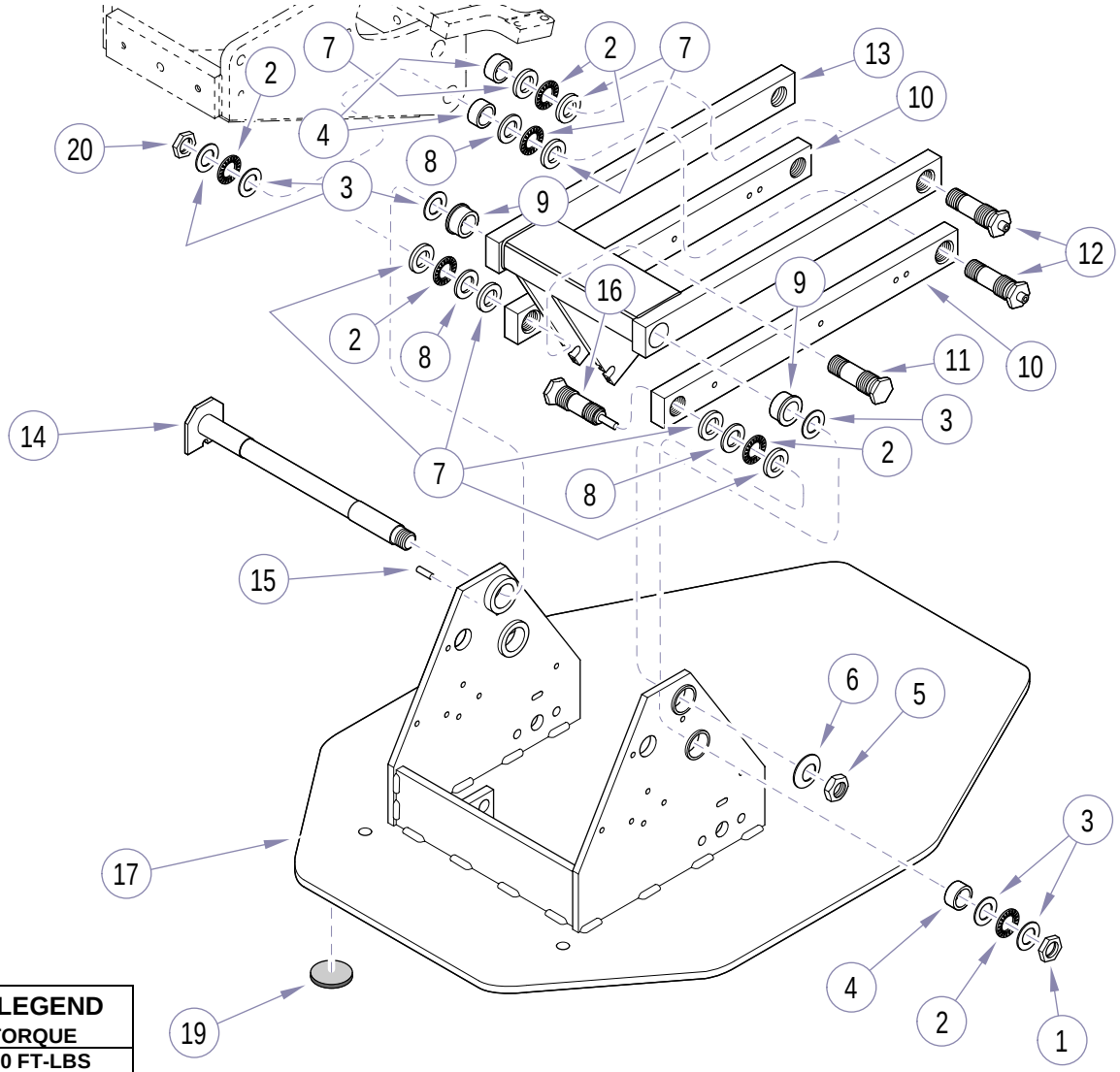
Non-Rotational Base Components (Concept L/R Classic)



TORQUE LEGEND	
ITEM#	TORQUE
1	10 FT-LBS (13.6 N•M)
11, 12, 16	75 FT-LBS (101.7 N•M)

NOTE: This model uses Pebble Grey painted components.

KA924501i

Item	Part No.	Description	Qty
1	119031-2	Nut	2
2	119033	Thrust Bearing (Apply 185171 Magnalube) (See Item 18)	12
3	119034	Thrust Race (1/32") (See Item 18)	14
4	119058	Bearing	6
5	041-0625-00	Nut	1
6	111534	Spring Washer	1
7	119035	Thrust Race (1/8") (See Item 18)	10
8	155287	Washer (See Item 18)	4
9	117086	Bearing	2
10	121521-00	Parallel Arm	2
11	120025-2	Pivot Screw	1
12	120024-2	Pivot Screw	4
13	151159-00	Lift Arm	1
14	149296-2	Shaft Assy	1
15	117518	Groove Pin	1
16	151336	Groove Pin Pivot Screw Assy	1
17	153167-00	Base Plate Weldment	1
18	152621	Thrust Bearing Kit (Not Shown) (Includes Items 2, 3, 7 and 8 in quantities listed. Also Includes Magnalube and Loctite).	
19	118286	Chair Base Pad	4
20	041-0750-02	Nut	4

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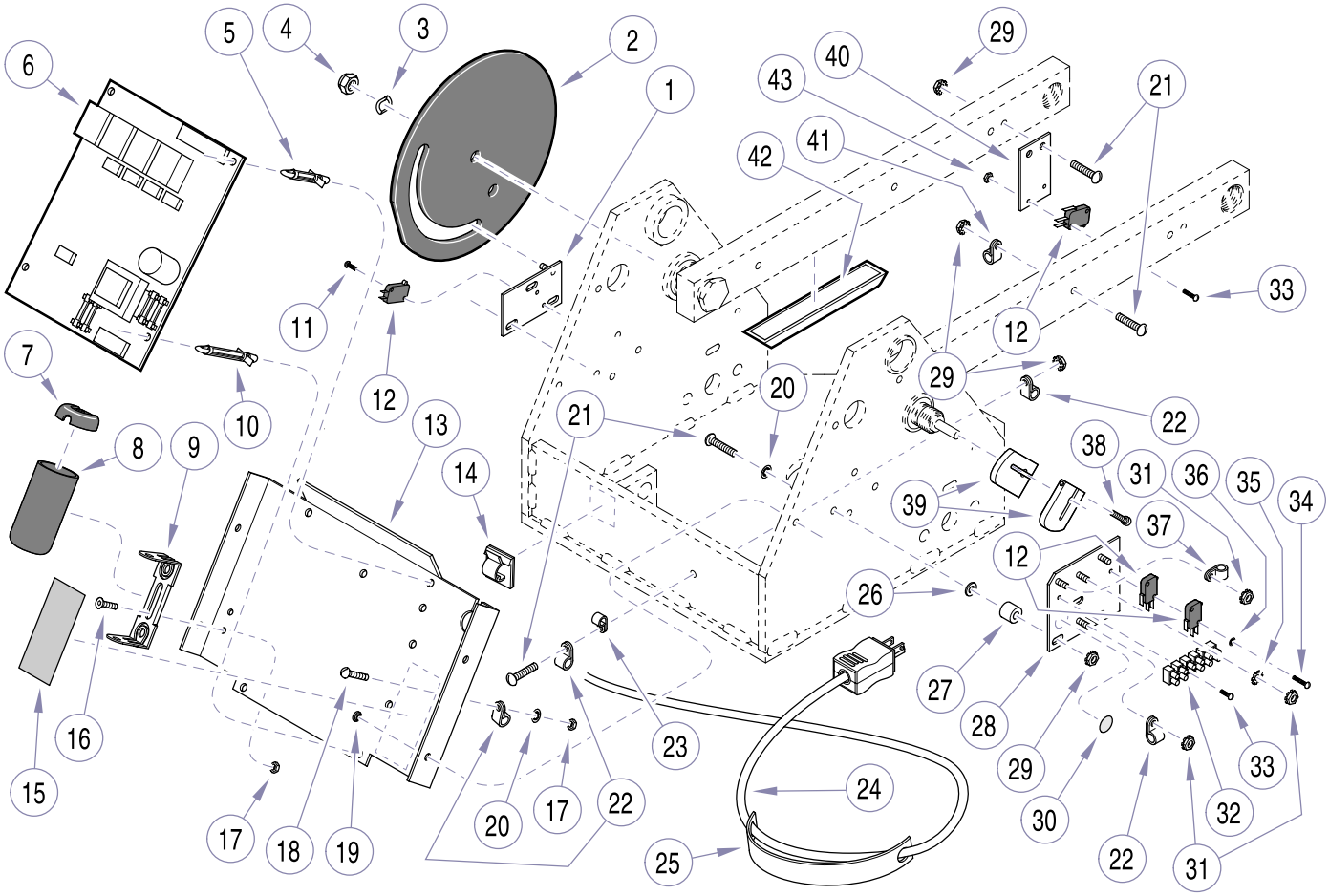
Base Electrical Components



KA916100

Item	Part No.	Description	Qty
1	121321-2	Program Plate	1
2	050-5664-00	Program Switch Cam	1
3	117706	Spring Washer	1
4	119593	Lock Nut	1
5	119690	Snap-in Support (short)	2
6	002-0699-00	Control PC Board (120-volt)	1
	152203R	Control PC Board (240-volt)	1
7	111868	Capacitor End Cap	1
8	116618	Capacitor (53-64 MFD / 330V) (120-volt Units)	1
	120047	Capacitor (12.5 MFD / 440V) (240-volt Units)	1
9	113045	Capacitor Bracket	1
10	121068	Snap-in Support (long)	2
11	22806	Screw	2
12	146978	Micro Switch	5
13	121054-2	Mounting Plate	1
14	109191	Cord Clip	5
15	119986	Fuse Warning Label	1
16	C5287	Screw	2
17	P507	Nut	3
18	P7017	Screw	1
19	117977	Self-Clinch Nut	4
20	P12575	Lock Washer	7

Item	Part No.	Description	Qty
21	117601	Screw	7
22	121656	Cable Clamp	3
23	121654	Cable Clamp	1
24	015-1526-00	Power Cord (Includes Item 25)	1
25	• 134384	• Warning Tag	1
26	P1673	Washer	6
27	121719	Spacer	6
28	151179	Electrical Connection Plate	1
29	122357	Lock Nut	13
30	112504	Ground Label	2
31	122358	Lock Nut	5
32	119483	Terminal Block	1
33	122806	Screw	6
34	155668	Screw	2
35	P14718	Lock Washer	2
36	105155	Lock Washer	2
37	121655	Cable Clamp	2
38	109104	Screw	2
39	119378	Cam	2
40	121520-2	Limit Switch Bracket	2
41	121877	Cable Clamp	2
42	119589	Latching Duct	1
43	P12479	Nut	4

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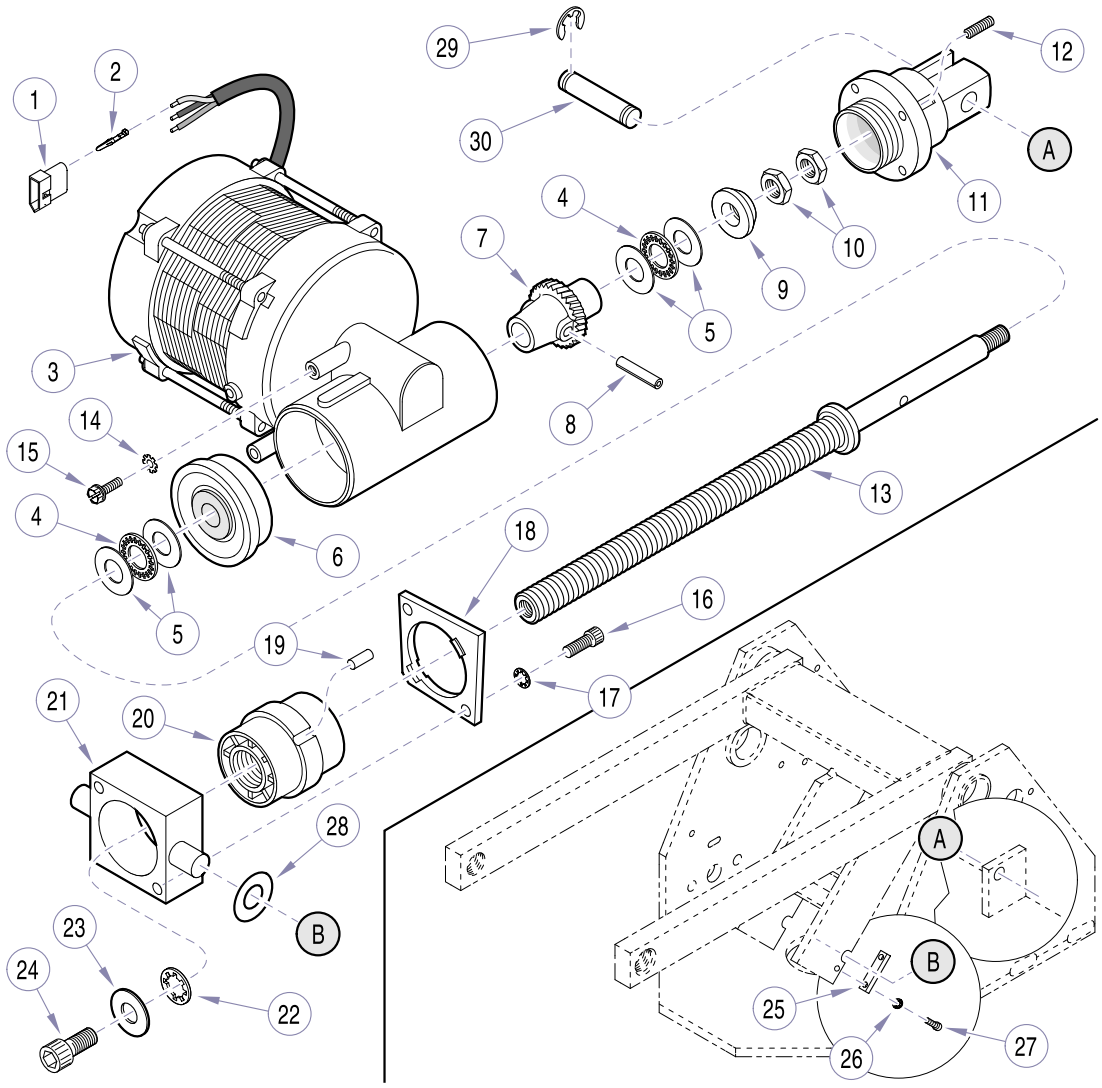
Base Motor Assembly



MA514900

Item	Part No.	Description	Qty
	152402	Base Motor Assembly (120-volt) (Includes Items 1 thru 24)	1
	152534	Base Motor Assembly (240-volt) (Includes Items 1 thru 24)	1
1	• 101927	• Connector	1
2	• 101928	• Terminal (Male)	3
3	• 121756	• Base Motor (120-volt) (Includes Items 4 thru 15)	1
3	• 121757	• Base Motor (240-volt) (Includes Items 4 thru 15)	1
4	• •	• • Thrust Bearing	2
5	• •	• • Bearing Race	4
6	• •	• • Bearing	1
7	• • 118624	• • Worm Wheel (See Item 31)	1
8	• • 118625	• • Roll Pin (See Item 31)	1
9	• •	• • Retaining Ring	1
10	• •	• • Nut	2
11	• •	• • Clevis	1
12	• •	• • Set Screw	2
13	• •	• • Screw Shaft	1
14	• •	• • Lockwasher	1
15	• •	• • Screw	1
16	• 108041	• Screw	2
17	• C2563	• Lock Washer	2
18	• 117159-2	• Trunnion Plate	1
19	• 122060	• Pin (See Item 32)	1
20	• 116912	• Drive Nut	1
21	• 121524-2	• Trunnion (See Item 32)	1
22	• C3454	• Lock Washer	1
23	• P50096	• Washer	1
24	• 117195	• Screw	1
25	120557-2	Trunnion Retainer Plate	2
26		Lock Washer	4
27		Screw	4
28	121510	Washer	2
29	042-0007-00	Retaining Ring	2
30	117149-2	Bottom Motor Pin	1
31	150459	Worm Wheel Kit (Not Shown) (Includes Items 7 and 8)	
32	152708	Trunnion Kit (Not Shown) (Includes Items 17 and 19)	

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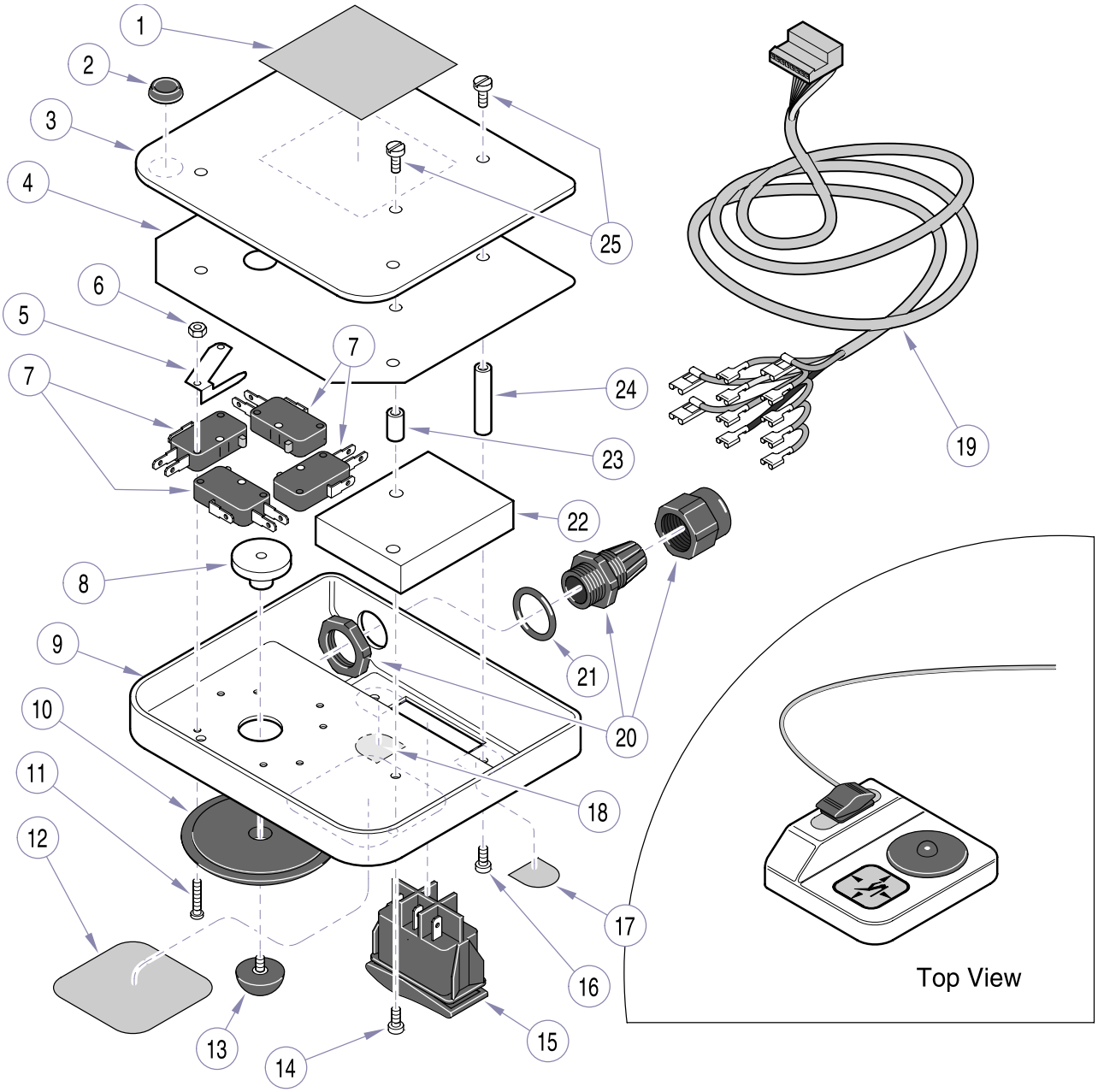
Footswitch



NOTE: This model uses Sterling Grey painted components.

MA492300

Item	Part No.	Description	Qty
	152713	Footswtich Assembly (Includes Items 1 thru 26)	1
1	• TP1714	• Inspection Sticker	1
2	• 119891	• Foot	4
3	• 120832-1	• Base Plate	1
4	• 121300	• Insulation	1
5	• 120046	• Actuator (Includes Item 6)	4
6	• •	• • Nut	2
7	• 146978	• Micro Switch	4
8	• 121383-2	• Activator	1
9	• 121998	• Footswitch Housing	1
10	• 121382	• Control Pad	1
11	• 113502	• Stud	8
12	• 120836	• Operating Label	1
13	• 120837	• Bumper	1
14	• 120861	• Stud	3
15	• 120839	• Rocker Switch	1
16	• 120898	• Stud	2
17	• 120848	• Green Label	1
18	• 122071	• Yellow Label	1
19	• 152715	• Cable Assembly (Includes Items 20 and 21 [Used on Early Units Only])	1
20	• • 120653	• • Strain Relief Clamp	1
21	• • P12349	• • O-Ring (Used on Early Units Only)	1
22	• 120858-1	• Counter Weight	1
23	• 120859	• Standoff (Short)	3
24	• 120860	• Standoff (Long)	2
25	• 117592	• Screw	5
26	• 115896	• Cable Tie (Not Shown)	2

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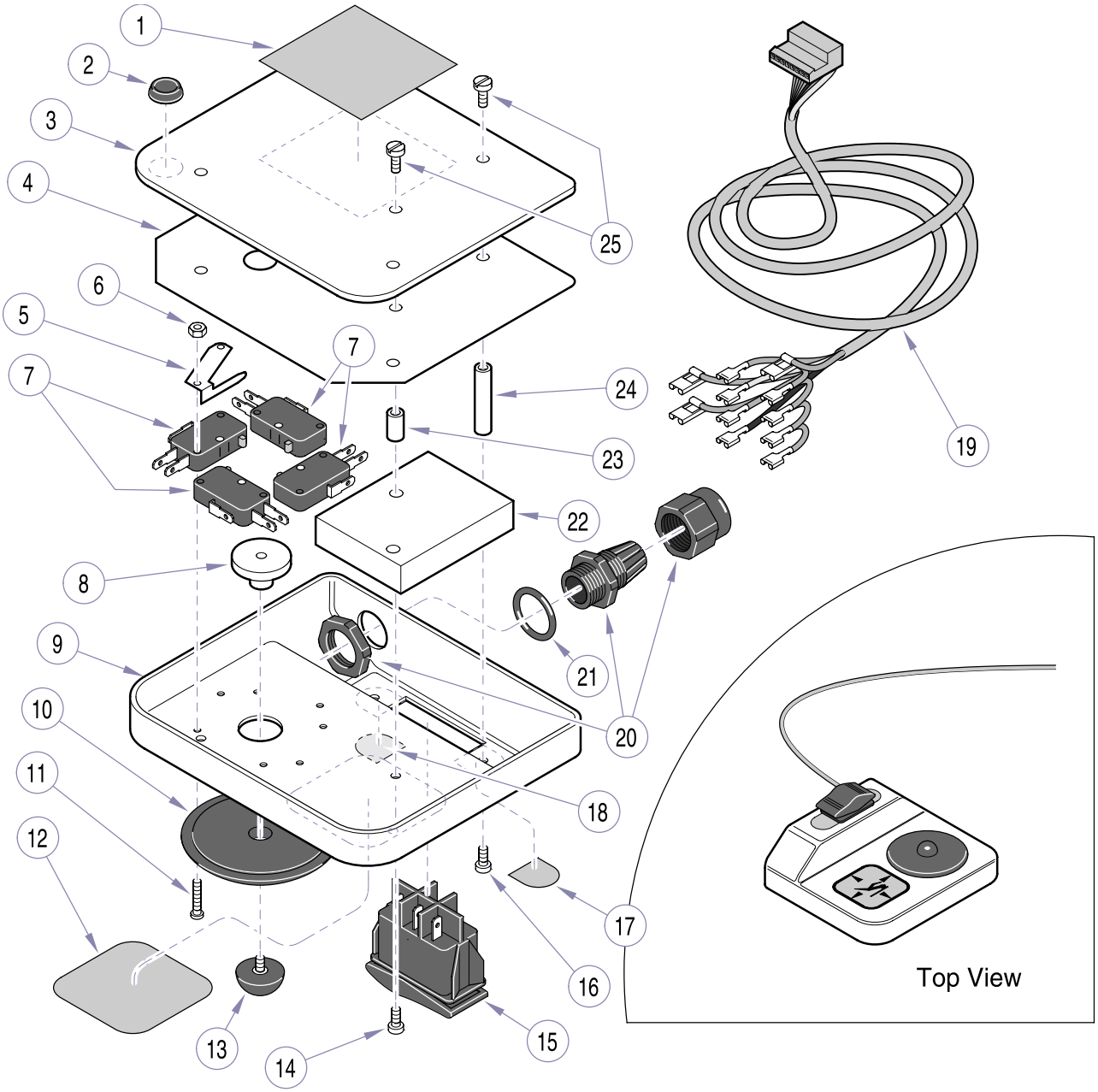
Footswitch



NOTE: This model uses Pebble Grey painted components.

MA492300

Item	Part No.	Description	Qty
	152713-01	Footswtich Assembly (Includes Items 1 thru 26)	1
1	• TP1714	• Inspection Sticker	1
2	• 119891	• Foot	4
3	• 120832-50	• Base Plate	1
4	• 121300	• Insulation	1
5	• 120046	• Actuator (Includes Item 6)	4
6	• •	• • Nut	2
7	• 146978	• Micro Switch	4
8	• 121383-2	• Activator	1
9	• 121998-01	• Footswitch Housing	1
10	• 121382	• Control Pad	1
11	• 113502	• Stud	8
12	• 061-0806-00	• Operating Label	1
13	• 120837	• Bumper	1
14	• 120861	• Stud	3
15	• 120839	• Rocker Switch	1
16	• 120898	• Stud	2
17	• 120848	• Green Label	1
18	• 122071	• Yellow Label	1
19	• 015-1533-00	• Cable Assembly (Includes Items 20 and 21 [Used on Early Units Only])	1
20	• • 120653	• • Strain Relief Clamp	1
21	• • P12349	• • O-Ring (Used on Early Units Only)	1
22	• 120858-50	• Counter Weight	1
23	• 120859	• Standoff (Short)	3
24	• 120860	• Standoff (Long)	2
25	• 117592	• Screw	5
26	• 115896	• Cable Tie (Not Shown)	2

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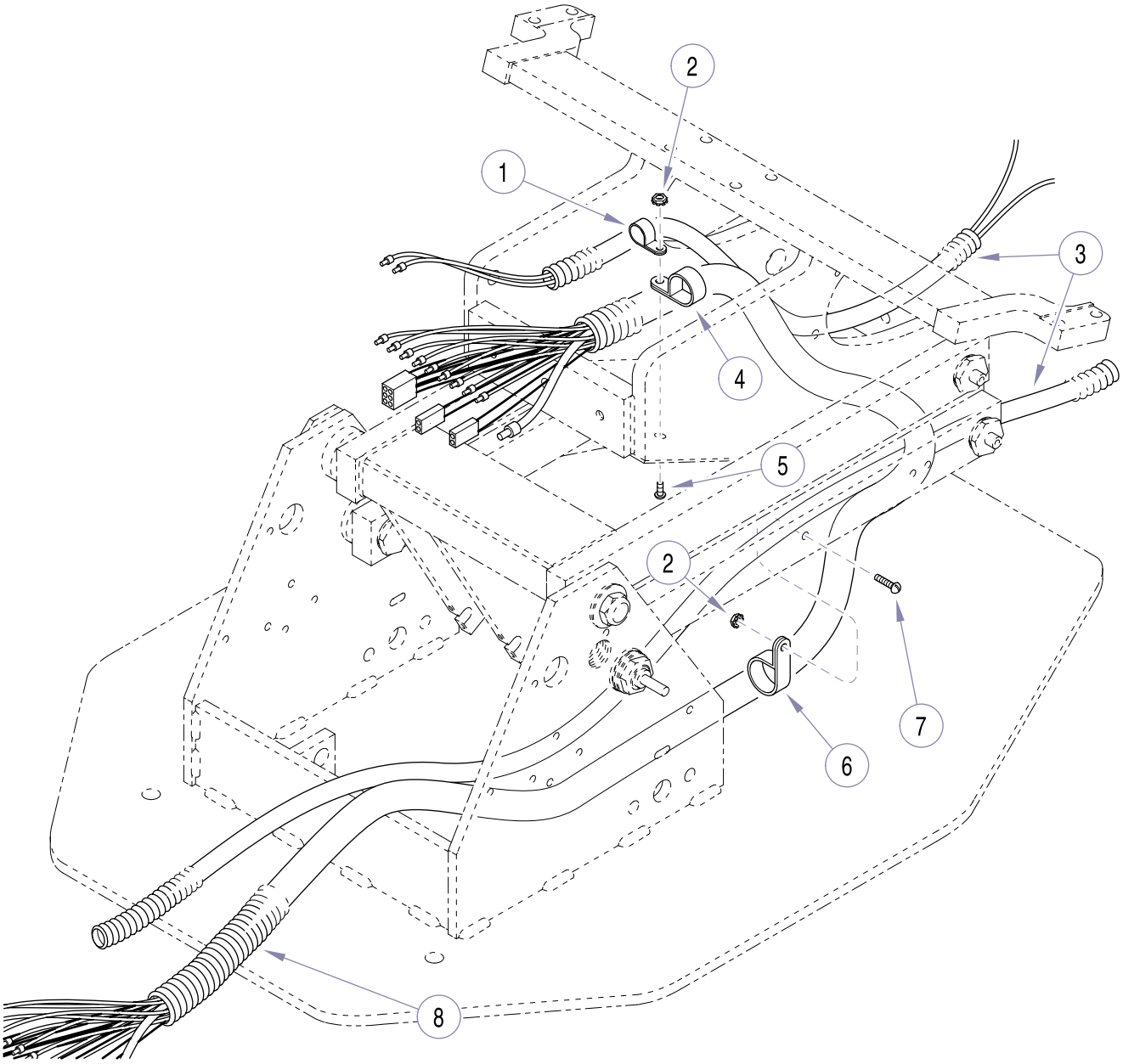
Umbilicals (Concept L/R Classic)



NOTE: This model uses Sterling Grey painted components.

KA924600

Item	Part No.	Description	Qty
1	122559	Cable Clamp	2
2	122357	Lock Nut	5
3	275255	Vacuum Tubing	A/R
4	122582	Cable Clamp	2
5	P7017	Screw	2
6	122583	Cable Clamp	3
7	117601	Screw	3
8	153142	Internal Umbilical	1
9	102308	Cable Tie (Not Shown)	4

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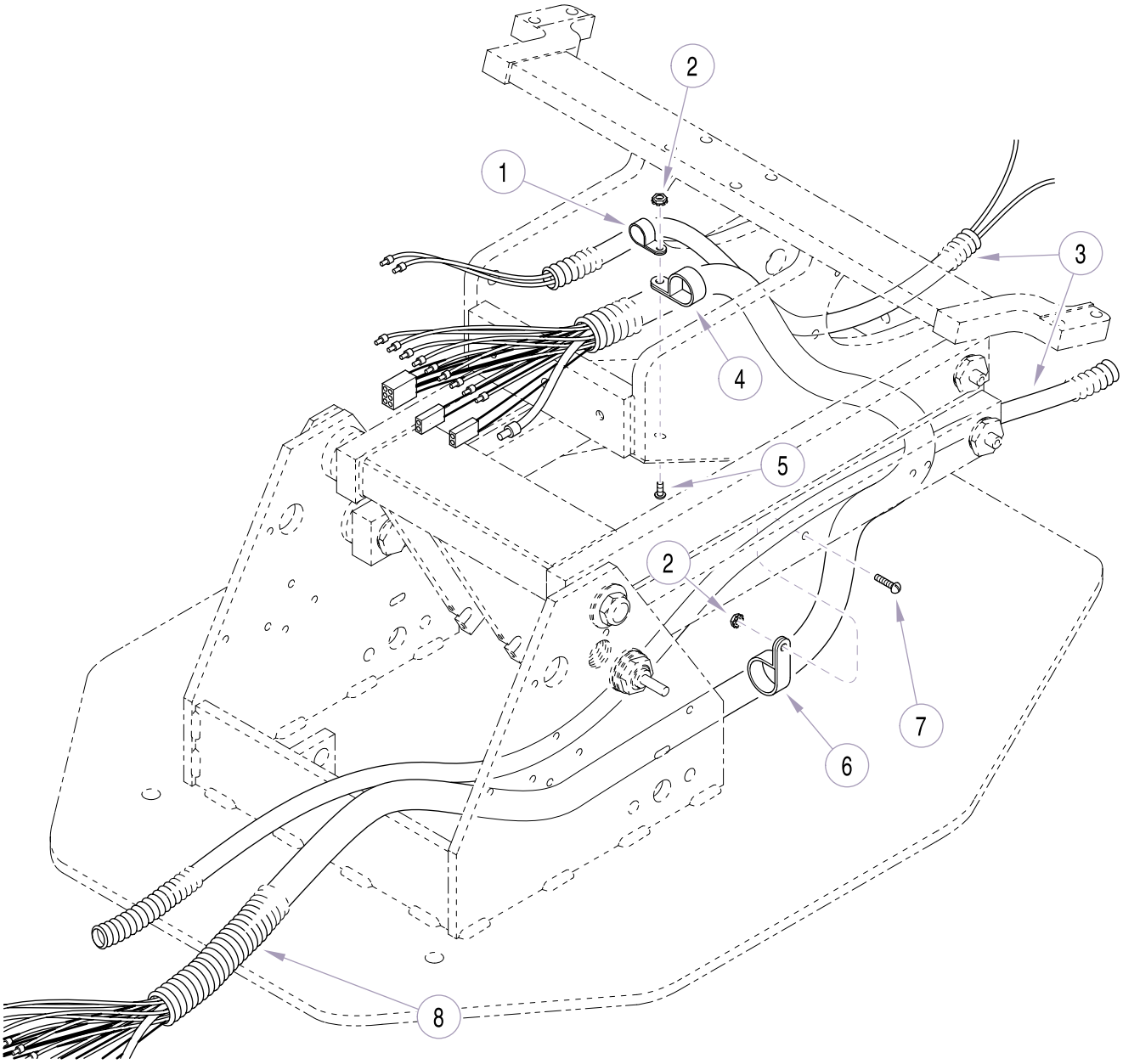
Umbilicals (Concept L/R Classic)



NOTE: This model uses Pebble Grey painted components.

KA924600

Item	Part No.	Description	Qty
1	122559	Cable Clamp	2
2	122357	Lock Nut	5
3	S059-00125	Vacuum Tubing	A/R
4	122582	Cable Clamp	2
5	P7017	Screw	2
6	122583	Cable Clamp	3
7	117601	Screw	3
8	153142-01	Internal Umbilical	1
9	102308	Cable Tie (Not Shown)	4

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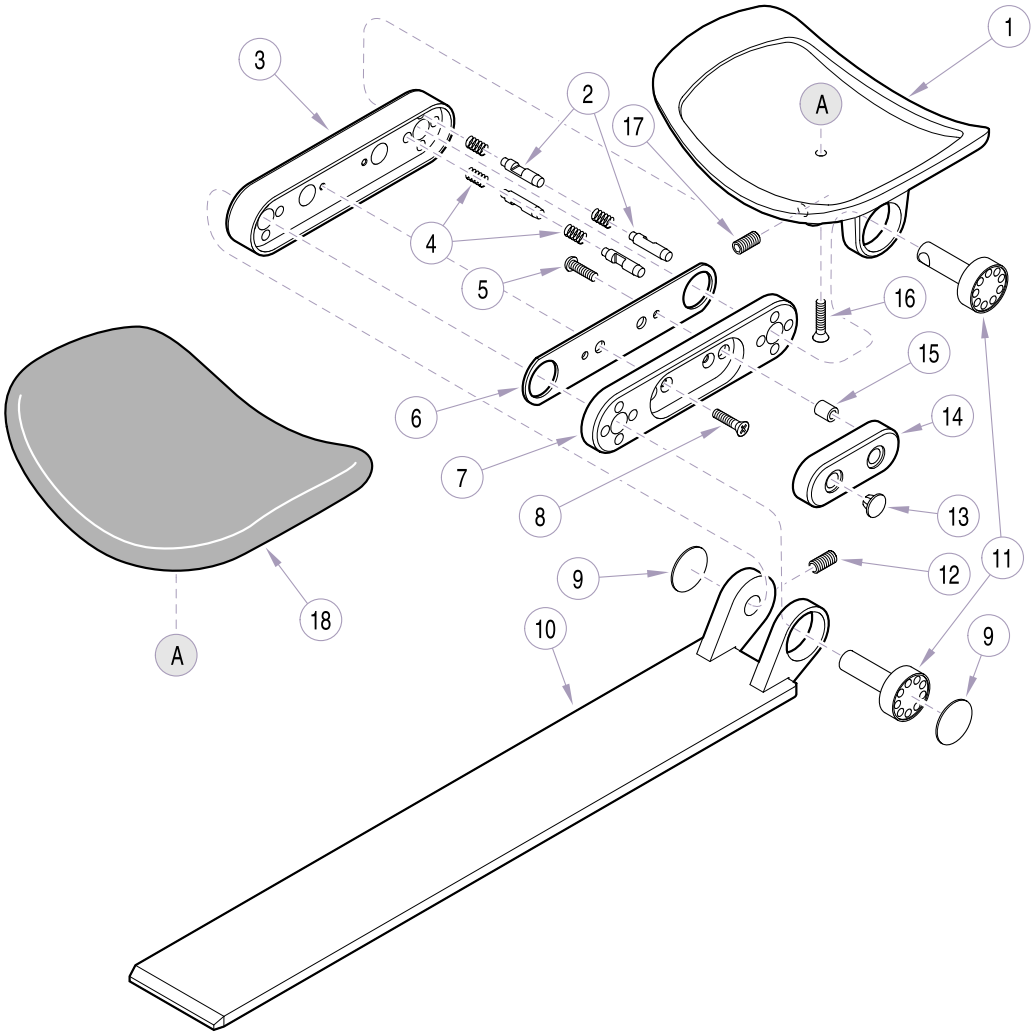
Double Articulating Headrest (152634)



NOTE: This model uses Sterling Grey painted components.

MA543500

Item	Part No.	Description	Qty
	152634xxx	**Dbl Art. Headrest (w/Vacu-Form uph.)** (includes items 1 thru 18)	1
	152634xx	**Dbl Art. Headrest (w/Plush uph.)** (includes items 1 thru 18)	1
1	• 121911-1	• Headrest Housing	1
2	• 121918-3	• Stop Pin	8
3	• 121913-1	• Spring Housing	1
4	• 103314	• Spring	8
5	• 122097	• Screw	2
6	• 121917-2	• Release Plate	1
7	• 121912-1	• Pin Housing	1
8	• 122096	• Screw	2
9	• 121945	• Decorative Disc	4
10	• 152905-1	• Tang Assembly	1
11	• 122772-3	• Pivot Pin	2
12	• 122778	• Setscrew	1
13	• 121968-1	• Plug	2
14	• 121915-1	• Button	1
15	• 122065-2	• Spacer	2
16	• 122089-1	• Screw	1
17	• 121488	• Set Screw	1
18	• 154032xxx	• Headrest Upholstery (Vacu-Form)	1
	• 154047xx	• Headrest Upholstery (Plush)	1

Item	Part No.	Description	Qty

UPHOLSYTERY COLOR CODES [replace xxx / xx]

VACU-FORM (xxx)		PLUSH (xx)	
Ash	VAS	Apricot	AP
Cobalt	VCO	Ash	AS
Dusty Jade	VDJ	Bone	BN
Slate Grey	VDG	Camel	CL
Dusty Rose	VDR	Cobalt	CO
Dk Wedgewood	VDW	Dusty Jade	DJ
Iris Blue	VIB	Desert Rose	DR
Grey	VLG	Grey Teal	GL
Mauve	VMV	Greystone	GS
Nile Green	VNG	Mauve	MV
Purple Grey	VPG	Purple Grey	PG
Royal Lavender	VRL	Dark Green	SA
Sage	VSA	Saffron	SF
Sand Grey	VSG	Taupe	TP
Taupe	VTP	Wedgewood	WW
Terra Rosa	VTR		
Lt. Wedgewood	VWW		

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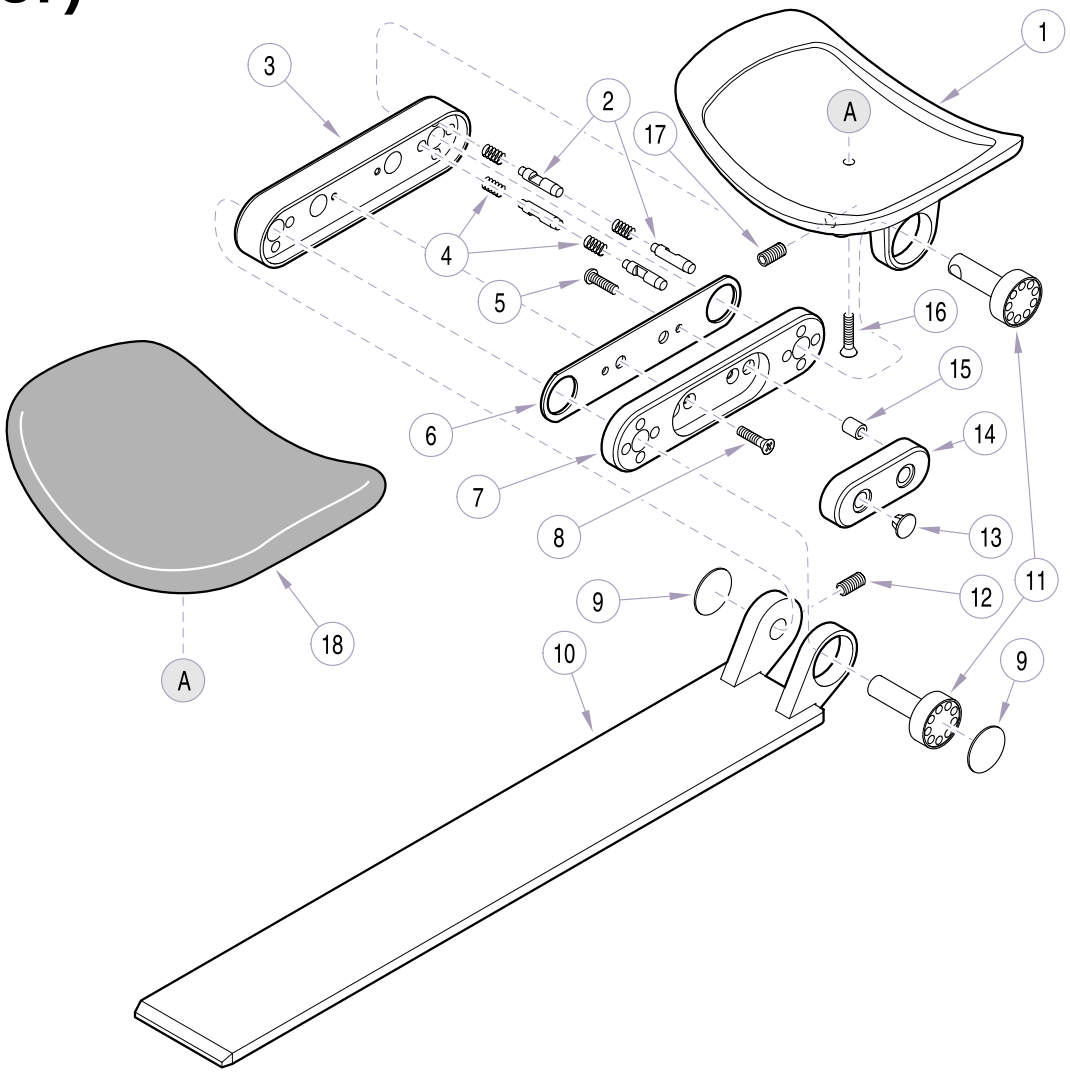
Double Articulating Headrest (154087)



NOTE: This model uses Pebble Grey painted components.

MA543500

Item	Part No.	Description	Qty
	154087-xxx	**Double Articulating Headrest** - (includes items 1 thru 18)	1
1	• 121911-00	• Headrest Housing	1
2	• 121918-3	• Stop Pin	8
3	• 121913-50	• Spring Housing	1
4	• 103314	• Spring	8
5	• 122784	• Screw	2
6	• 121917-2	• Release Plate	1
7	• 121912-50	• Pin Housing	1
8	• 122096	• Screw	2
9	• 121945	• Decorative Disc	4
10	• 152905-50	• Tang Assembly	1
11	• 122772-3	• Pivot Pin	2
12	• 122778	• Set Screw	1
13	• 053-1333-50	• Plug	2
14	• 121915-50	• Button	1
15	• 122065-2	• Spacer	2
16	• 122089-50	• Screw	1
17	• 121488	• Set Screw	1
18	• 154079-xxx	• Vacu Form Upholstery	1
	• 154080-xxx	• Plush Upholstery	1

Item	Part No.	Description	Qty

UPHOLSTERY COLOR CODES (replaces -xxx)

Vacu Form		Plush	
Sand Grey	-95	Apricot	-131
Iris Blue	-96	Ash	-132
Nile Green	-100	Bone	-133
Royal Lavender	-101	Lt. Camel	-134
Terra Rosa	-102	Cobalt	-135
Slate Grey	-103	Dusty Jade	-136
Mauve	-111	Desert Rose	-137
Sage	-112	Grey Teal	-138
Purple Grey	-113	Greystone	-139
Taupe	-114	Purple Grey	-140
Royal Carriage	-124	Dark Green	-141
Soft Pearl	-126	Saffron	-142
Ash	-127	Lt. Wedgewood	-143
Dusty Jade	-128	Taupe	-144
Lt. Wedgewood	-129	Mauve	-145
Cobalt	-130	Special	-99
Desert Rose	-146		
Special	-99		

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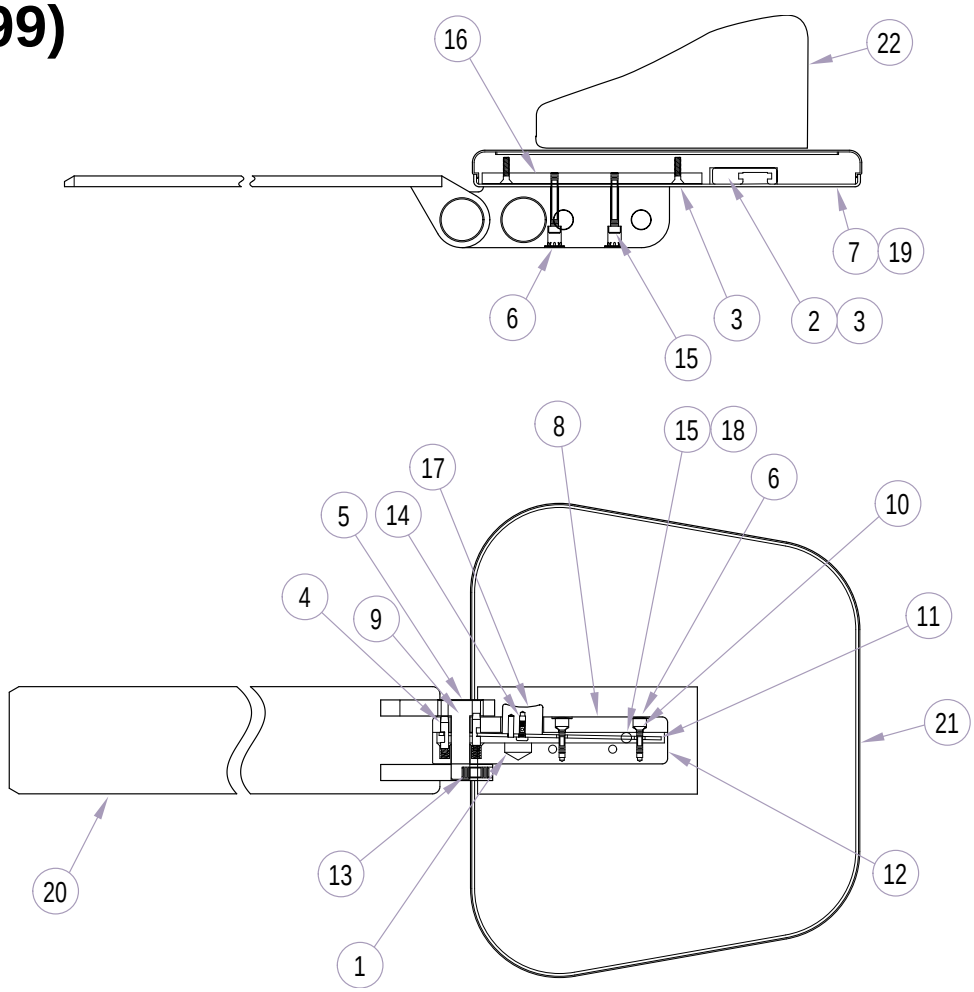
Single Articulating Headrest (153199)



NOTE: This model uses Sterling Grey painted components.

MA613400i

Item	Part No.	Description	Qty
	153199	**Single Articulating Headrest** - (includes items 1 thru 20)	1
1	• 103314	• Spring	4
2	• 121493-1	• Headrest Receptacle	1
3	• 121784	• Screw	6
4	• 121918-3	• Stop Pin	4
5	• 121945	• Decorative Disc	2
6	• 121968-1	• Plug	4
7	• 122677	• Back Cover	1
8	• 122757-1	• Pin Housing	1
9	• 122772-3	• Pivot Pin	1
10	• 122096	• Screw	2
11	• 122776-2	• Release Plate	1
12	• 122777-1	• Spring Housing	1
13	• 122778	• Screw *(use adhesive #042-0024-00)*	1
14	• 122784	• Screw	1
15	• 122775	• Release Plate Rocker	2
16	• 122805-1	• Mounting Plate	1
17	• 153258-1	• Push Button Assembly	1
18	• 185171	• Lubricant	AR
19	• 275184	• Foam Tape	AR
20	• 153249-1	• Tang Weldment	1
21	154090-xxx	Headrest Board *(vacu-form)*	1
	154092-xxx	Headrest Board *(plush)*	1
22	154089-xxx	Magnetic Cushion *(vacu-form)*	1
	154089-xxx	Magnetic Cushion *(plush)*	1

UPHOLSTERY COLOR CODES (replaces -xxx)

Vacu Form		Plush	
Sand Grey	-95	Apricot	-131
Iris Blue	-96	Ash	-132
Nile Green	-100	Bone	-133
Royal Lavender	-101	Lt. Camel	-134
Terra Rosa	-102	Cobalt	-135
Slate Grey	-103	Dusty Jade	-136
Mauve	-111	Desert Rose	-137
Sage	-112	Grey Teal	-138
Purple Grey	-113	Greystone	-139
Taupe	-114	Purple Grey	-140
Royal Carriage	-124	Dark Green	-141
Soft Pearl	-126	Saffron	-142
Ash	-127	Lt. Wedgewood	-143
Dusty Jade	-128	Taupe	-144
Lt. Wedgewood	-129	Mauve	-145
Cobalt	-130	Special	-99
Desert Rose	-146		
Special	-99		

Always Specify Model & Serial Number

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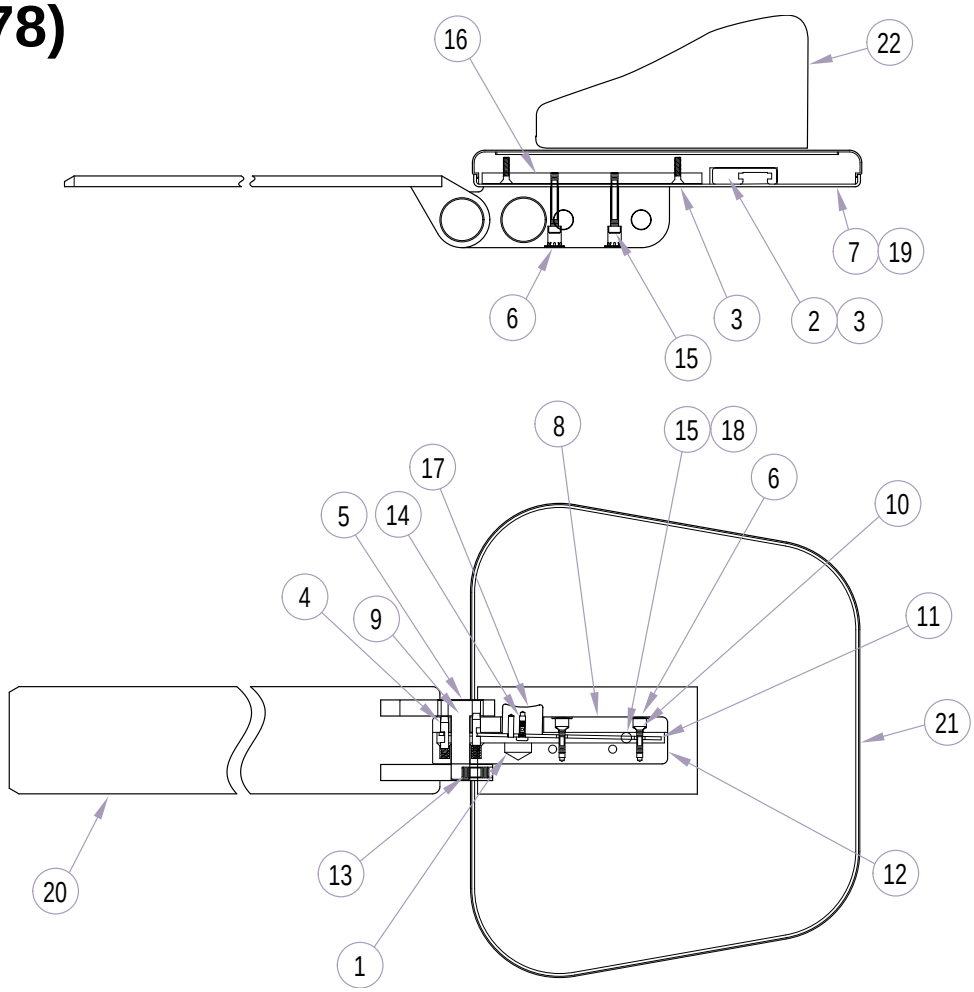
Single Articulating Headrest (154078)



NOTE: This model uses Pebble Grey painted components.

MA613400i

Item	Part No.	Description	Qty
	154078-xxx	**Single Articulating Headrest** - (includes items 1 thru 22)	1
1	• 103314	• Spring	4
2	• 121493-01	• Headrest Receptacle	1
3	• 121784	• Screw	6
4	• 121918-3	• Stop Pin	4
5	• 121945	• Decorative Disc	2
6	• 121968-50	• Plug	4
7	• 122677-01	• Back Cover	1
8	• 122757-50	• Pin Housing	1
9	• 122772-3	• Pivot Pin	1
10	• 122096	• Screw	2
11	• 122776-2	• Release Plate	1
12	• 122777-50	• Spring Housing	1
13	• 122778	• Screw *(use adhesive #042-0024-00)*	1
14	• 122784	• Screw	1
15	• 122775	• Release Plate Rocker	2
16	• 122805-50	• Mounting Plate	1
17	• 153258-50	• Push Button Assembly	1
18	• 185171	• Lubricant	AR
19	• 275184	• Foam Tape	AR
20	• 153249-50	• Tang Weldment	1
21	• 154090-xxx	• Headrest Board *(vacu-form)*	1
	• 154092-xxx	• Headrest Board *(plush)*	1
22	• 154089-xxx	• Magnetic Cushion *(vacu-form)*	1
	• 154089-xxx	• Magnetic Cushion *(plush)*	1

UPHOLSTERY COLOR CODES (replaces -xxx)

Vacu Form		Plush	
Sand Grey	-95	Apricot	-131
Iris Blue	-96	Ash	-132
Nile Green	-100	Bone	-133
Royal Lavender	-101	Lt. Camel	-134
Terra Rosa	-102	Cobalt	-135
Slate Grey	-103	Dusty Jade	-136
Mauve	-111	Desert Rose	-137
Sage	-112	Grey Teal	-138
Purple Grey	-113	Greystone	-139
Taupe	-114	Purple Grey	-140
Royal Carriage	-124	Dark Green	-141
Soft Pearl	-126	Saffron	-142
Ash	-127	Lt. Wedgewood	-143
Dusty Jade	-128	Taupe	-144
Lt. Wedgewood	-129	Mauve	-145
Cobalt	-130	Special	-99
Desert Rose	-146		
Special	-99		

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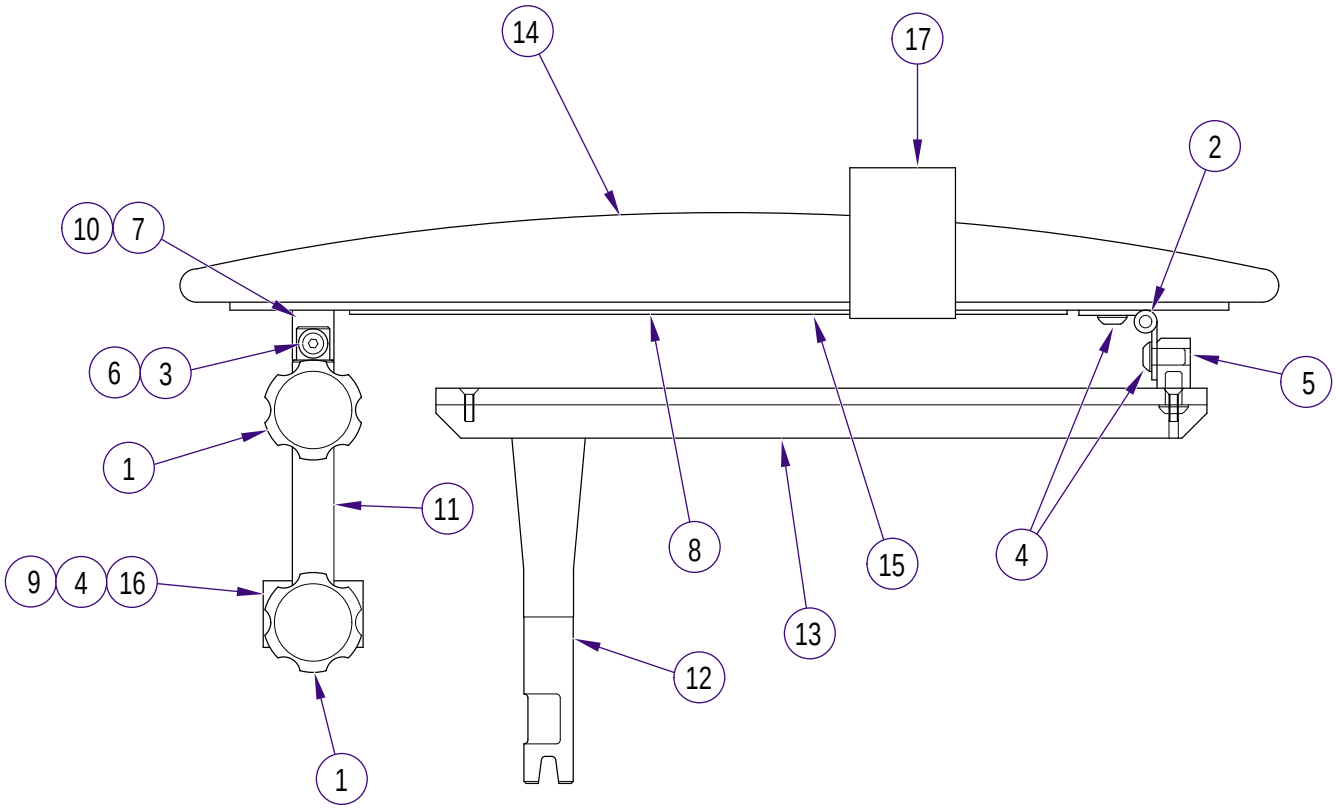
IV Armboard (152565)



NOTE: This model uses Sterling Grey painted components.

MA613300i

Item	Part No.	Description	Qty
	152565	**IV Armboard** (includes items 1 thru 17)	1
1	• 117366	• Knob *(use adhesive #042-0024-00)*	2
2	• 118249-2	• Legrest Hinge	1
3	• 120611-2	• Shoulder Screw	1
4	• 120950	• Screw	6
5	• 121839-1	• Toe Block	1
6	• 121840-2	• Armboard Rod	1
7	• 121850	• Screw *(use adhesive #042-0024-00)*	2
8	• 121847-1	• Bottom Cover	1
9	• 121848-1	• Mounting Block	1
10	• 121845-1	• Mounting Bracket	1
11	• 121853-1	• Strut	1
12	• 152558-1	• Post Assembly	1
13	• 152563	• Slide Assembly	1
14	• 152564xxx	• Upholstery	1
15	• 177723	• Velcro (loop - female)	[.011]
16	• 275184	• Foam Tape	[.25]
17	• 152562	• Arm Band	1

UPHOLSTERY COLOR CODES (replaces -xxx)

Vacu Form

Sand Grey	VSG
Iris Blue	VIB
Nile Green	VNG
Royal Lavender	VRL
Terra Rosa	VTR
Slate Grey	VDG
Mauve	VMV
Sage	VSA
Purple Grey	VPG
Taupe	VTP
Ash	VAS
Dusty Jade	VDJ
Lt. Wedgewood	VWW
Cobalt	VCO
Dusty Rose	VDR
Dk. Wedgewood	VDW
Grey	VLG

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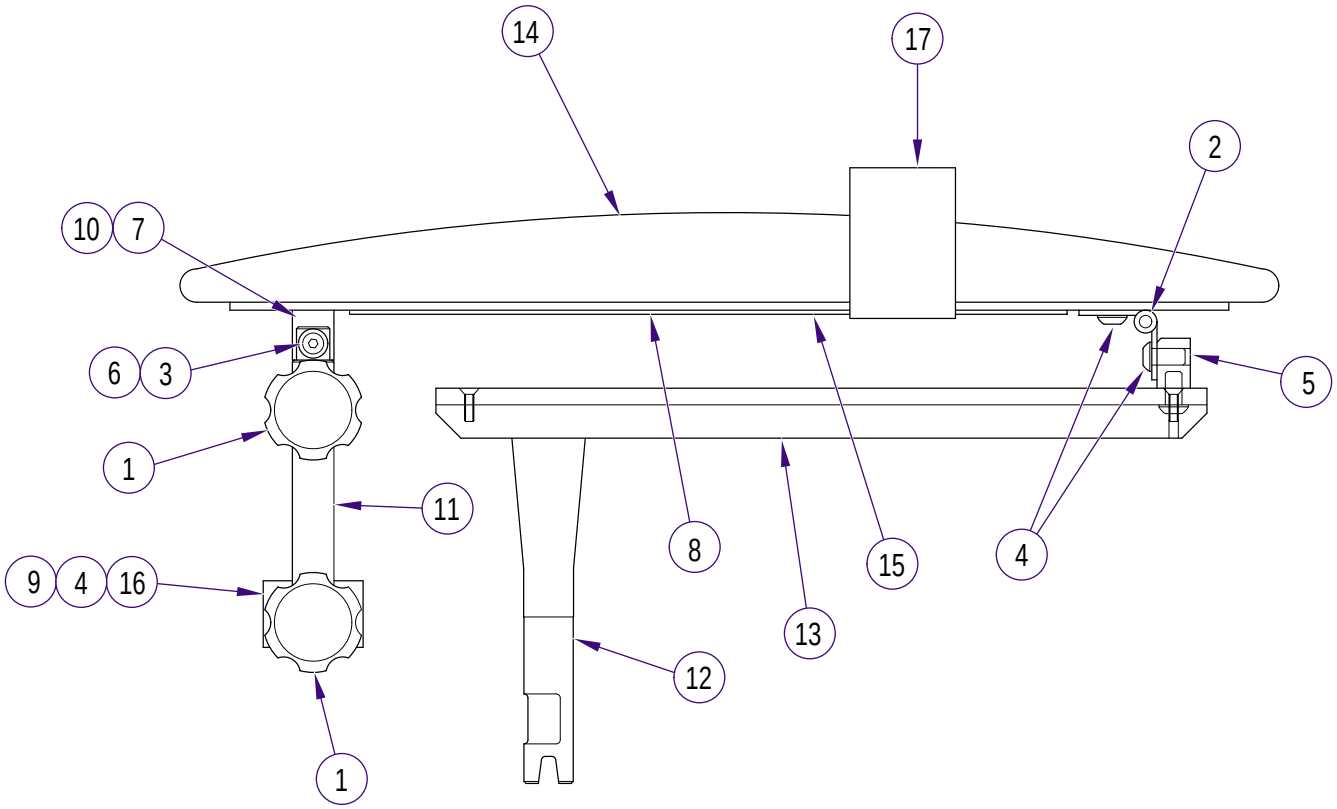
IV Armboard (154088)



NOTE: This model uses Pebble Grey painted components.

MA613300i

Item	Part No.	Description	Qty
	154088-xxx	**IV Armboard** (includes items 1 thru 17)	1
1	• 117366	• Knob *(use adhesive #042-0024-00)*	2
2	• 118249-2	• Legrest Hinge	1
3	• 120611	• Shoulder Screw	1
4	• 120950	• Screw	6
5	• 121839-50	• Toe Block	1
6	• 121840-2	• Armboard Rod	1
7	• 121850	• Screw *(use adhesive #042-0024-00)*	2
8	• 121847-50	• Bottom Cover	1
9	• 121848-50	• Mounting Block	1
10	• 121845-50	• Mounting Bracket	1
11	• 121853-50	• Strut	1
12	• 152558-50	• Post Assembly	1
13	• 152563-01	• Slide Assembly	1
14	• 152564xxx	• Upholstery	1
15	• 177723	• Velcro (loop - female)	[.011]
16	• 275184	• Foam Tape	[.25]
17	• 152562	• Arm Band	1

Item	Part No.	Description	Qty
		UPHOLSTERY COLOR CODES (replaces -xxx)	
		Vacu Form	
		Sand Grey	VSG
		Iris Blue	VIB
		Nile Green	VNG
		Royal Lavender	VRL
		Terra Rosa	VTR
		Slate Grey	VDG
		Mauve	VMV
		Sage	VSA
		Purple Grey	VPG
		Taupe	VTP
		Ash	VAS
		Dusty Jade	VDJ
		Lt. Wedgewood	VWW
		Cobalt	VCO
		Dusty Rose	VDR
		Dk. Wedgewood	VDW
		Grey	VLG

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FAX ORDERING FORM

(SERVICE PARTS ONLY)

NOTES:

- **ALL BLOCKED AREAS MUST BE COMPLETED.**
- **USE FOR NON-WARRANTY FAX ORDERS ONLY. WARRANTY ORDERS MUST BE TELEPHONED IN (1-800-MIDMARK).**

ATTENTION: SERVICE DEPARTMENT FAX#: 877-249-1793

ACCT #: _____ **P.O. #:** _____ **DATE:** _____

NAME: _____ **SHIP TO:** _____

ADDRESS: _____

CITY, ST.: _____

CONTACT: _____

PHONE: _____

☐ **NON-EMERGENCY ORDER - TO SHIP WITHIN 72 HOURS IF PART(S) IN STOCK.**

☐ **EMERGENCY ORDER - TO SHIP WITHIN 24 HOURS IF PART(S) IN STOCK (IF ORDER IS RECEIVED BEFORE 1:30 P.M. E.S.T).**

SEND NOTIFICATION IF PARTS ARE NOT AVAILABLE TO SHIP WITHIN 24 HOURS VIA E-MAIL OR FAX TO: _____

METHOD OF SHIPMENT **OTHER** _____

UPS	FED EX
☐ NEXT DAY A.M.	☐ NEXT DAY A.M.
☐ NEXT DAY P.M.	☐ NEXT DAY P.M.
☐ 2ND DAY	☐ 2ND DAY
☐ GROUND	☐ ECONOMY

QTY.	PART #	DESCRIPTION (SPECIFY COLOR OF ITEM IF APPLICABLE)	COLOR CODE	PRICE/PER

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P.O. Box 286
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Fax 937-526-5542
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